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PALMAR DERMATOGLYPHICS OF THE MUNDAS OF ORISSA

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Abstract : The present paper records the analysis of the palmar dermatoglyphic patterns of 127 Mundas (65 male and 62 female), a scheduled tribe of Sundargarh district, Orissa.

The endings of various main lines, mainline index, axial triradius and patterns in the hypothenar area, thenar and in all the interdigital areas have been studied. The bilateral palmar prints and sexual variation in respect of these traits have also been discussed.

The Mundas bear close affinity with the Santals as regards the pattern incidence in hypothenar, third and fourth interdigital areas ; but differ from all the Protoaustraloid groups when thenar and first interdigital area, and second interdigital area are taken into consideration.

Introduction

THE Mundas are a well-known tribe in India living in the states of Orissa, Bihar and Madhya Pradesh and speaking the Mundari language. In Orissa, according to the 1961 census, their population is 221,399. They are found in all the districts of Orissa. Their concentration is observed in Sundargarh Sambalpur and Keonjhar districts. All the above districts are contiguous and there is no doubt that the tribe

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used to occupy the continuous hilly tract of these districts long before the present boundaries of the districts were defined.

The material was collected by the second author during 1963 from the Sundargarh district. Since there is no published data on the dermatoglyphics on the Mundas of Orissa, we venture to publish the material, though the size of the sample is rather small.

Material and Method

The bilateral palmar prints were collected from 127 unrelated individuals, 65 male and 62 female, from villages around Rourkela and Rajgangpur in Sundargarh district. The techniques followed for collection and analysis of the palmar prints are as described by Cummins and Midlo (1961). The endings of the various main lines, main-line index, position and number of axial triradius, and patterns in the hypothenar area, thenar and first interdigital areas, second, third and fourth interdigital areas are investigated for each and every palm.

Results and Discussion

The frequency of different main-line formulae of the male and female Mundas is recorded in Table 1.

It is noticed from the table that among the male Mundas, 35 different types of formulae are present compared to 32 in the female. The left and right palms in males exhibit 14 and 8 different formulae, whereas in the females the left and right palms exhibit 11 and 9 different formulae. Further, 13 different formulae are common to both hands in males and 12 in females.

Bisexual variation is observed in the frequency of symmetrical endings of the four main-lines D, C, B and A. The frequency of symmetrical endings of the main lines in males is 23% while it is 37.09% in females.

It is also apparent from the Table 1 that in males the 11.9.7.4 type of formula appears to be highest (13.07%). But in the case of females this appears in slightly lower frequency (12.09%). In the case of females, the highest frequency is of the main-line formula 7.5".5".3 with a frequency of 19.35%, which is followed by 9.7.5".3 (12.90%) and then by 11,9.7.4 (12.09%).

TABLE 1

Frequencies of different main-line formulae of the Mundas

Male (n=65)

Main-line formulae	L	%	R	%	L+R	%
11.7.9.3	1	1.54	—	—	1	0.77
11.7.7.4	3	4.61	—	—	3	2.31
11.11(10).9.5'	—	—	3	4.61	3	2.30
11.10.8.5'	—	—	2	3.08	2	1.54
11.9.7.3	3	4.61	5	7.70	8	6.15
11.9.7.4	2	3.08	15	23.07	17	13.07
11.9.7.5'	3	4.61	6	9.23	9	6.92
10.x.7.5'	—	—	1	1.54	1	0.77
10.7.7.3	—	—	1	1.54	1	0.77
10.7.9.4	—	—	1	1.54	1	0.77
10.9.6.3	—	—	2	3.08	2	1.54
10.9.7.4	1	1.54	—	—	1	0 77
10.9.7.3	1	1.54	1	1.54	2	1.54
10.9.7.5'	1	1.54	1	1.54	2	1.54
9.9.5".3	2	3.08	—	—	2	1.54
9(10).9.5'.1	1	1.54	—	—	1	0.77
9.8(9).5'.4	2	3.08	—	—	2	1.54
9.7.4.3	1	1.54	—	—	1	0.77
9.7.5".3	10	15.38	3	4.61	13	10.00
9.7.5".4	3	4.61	6	9.23	9	6.93
9.7.5".5	1	1.54	—	—	1	0.77
8.6.5".3	1	1.54	2	3.08	3	2.31
8(7).5".6.3	1	1.54	—	—	1	0.77
7.9.5'.4	1	1.54	3	4.61	4	3.07
7.9.5'.3	1	1.54	1	1.54	2	1.54
7.9.5".4	1	1.54	1	1.54	2	1.54
7.9.7.3	1	1.54	—	—	1	0.77
7.7.5".4	2	3.08	—	—	2	1.54
7.7.4.3	1	1.54	—	—	1	0.77
7.6.5'.3	1	1.54	—	—	1	0.77
7.5".4.3	9	13.84	2	3.08	11	8.46
7.5".5".3	9	13.84	4	6.15	13	10.00
7.5".5".4	—	—	4	6.5	4	3.07
7.5".5'.2	2	3.08	—	—	2	1.54
7.5".5".5'	—	—	1	1.54	1	0.77

TABLE 1(a)

Frequencies of different main-line formulae of the Mundas

Female (n=62)

Main-line formulae	L	%	R	%	L+R	%
11.7.9.5′	—	—	2	3.23	2	1.61
11.7.7.2	1	1.61	—	—	1	0.81
11(7).7.9.4	2	3.23	5	8.07	7	5.64
11.7.9.3	2	3.23	1	1.61	3	2.42
11.7.7.4	2	3.23	—	—	2	1.61
11(7).9.5′.4	—	—	1	1.61	1	0.81
11.x.7.4	1	1.61	—	—	1	0.81
11.9.7.3	3	4.84	3	4.84	6	4.84
11 9.7,4	3	4.84	12	19.36	15	12.09
11.9.7.5′	—	—	1	1.61	1	0,81
10.x.7(6).3	—	—	1	1.61	1	0.81
10,7.7.3	1	1.61	—	—	1	0.81
10.9.6.3	—	—	1	1.61	1	0.81
9.9 5″.3	5	8.07	1	1.61	6	4.84
9.9.5″.4	4	6.45	—	—	4	3.22
9.9.5.″5′	1	1.61	—	—	1	0.81
9.x.5′.4	—	—	1	1.61	1	0,81
9.7.4.3	1	1.61	—	—	1	0.81
9(7).9.4.4	1	1.61	—	—	1	0.81
9.9.4.3	1	1.61	—	—	1	0.81
9.7.5″.3	9	14.52	7	11.29	16	12.90
9.7.5″.4	2	3.23	2	3.23	4	3.22
8(7).6.4.3	—	—	1	1.61	1	0.81
7.9,5′.4	—	—	1	1.61	1	0.81
7.9.5′.3	1	1.61	3	4.84	4	3.22
7.9.4.3	—	—	2	3.23	2	1.61
7.9.7.3	1	1.61	—	—	1	0.81
7.7.5″.3	1	1.61	—	—	1	0.81
7.5″.4.3	4	6.45	3	4.84	7	5.64
7.5″.5″.3	14	22.59	10	16.13	24	19.35
7.5″.5″.4	1	1.61	3	4.84	4	3.22
7.5″.5′.2	1	1.61	1	1.61	2	1.61

Omitting the ending of line A, the frequencies of Wilder's three main-line formulae 11.9.7 –, 9.7.5 – and 7.5.5 – are obtained and they are presented in Table 2.

TABLE 2

Frequency of some tmportant main-line formulae

	Male (n=65)			Female (n=62)		
Formula	L	R	L+R	L	R	L+R
11.9.7 –	8	26	34	6	16	22
%	12.30	40.00	26.15	9.68	25.81	17.74
9.7.5 –	14	9	23	11	9	20
%	21.53	13.84	17.70	17.75	14.52	16.12
7.5.5 –	11	9	20	16	14	30
%	16.92	13.84	15.38	25.81	22.58	24.18

It is noticed from Table 2 that the formula 11.9.7 – is highest in males, which is followed by formula 9.7 5 – and 7.5.5 –, while females exhibit the highest frequency of the formula 7.5.5 – followed by 9.7.5 – and 11.9.7 –. The modal type for the three main-line formula D, C and B is 11.9.7 – >9.7 5 – >7.5 5 – in males, whereas among the females, the modal type is 7.5.5 – >9.7.5 – >11.9.7 –. Combining both sexes it is found that the modal type is 7.5.5 – >11.9.7 – >9.7.5 –.

In Table 3, the percentile distribution of terminations of different main lines D, C, B and A are presented. It is observed that the terminations of line – D in both the sexes are restricted to the distal borders of the palm ; mainly to 7,9 and 11 dermatoglyphics areas of the palm. Among males, the line -D ends in 7,9 and 11 zone in 33.85%, 22.30% and 33.08% respectively. But in the case of females, 37.10% of line -D terminates in 7, 28.23% in 9 and 31.44% in 11 zone. The majority of line -C terminates in 9,7 and 5″. In the case of males, the frequencies of the line ending in 9,7 and 5″ are 40.77%, 25.38% and 26.62% respectively ; and in the case of females, the frequencies are 36.29%, 30.64% and 29.84%. The abortive type of main-line is observed only in case of the

line -C with frequency of 0.77% in males and 2.42% in females. The majority of the line -B terminates in 7, 5″ and 4. Both in males and females the highest frequencies of termination of line -B is observed in 5″ with 38.46% among males and 48.38% among females. In both the sexes, the line -A mostly terminates in 3 and 4 ; with a frequency of 48.46% in males and 61.30% in females in zone 3, while 34.62% among males and 33.6% in females terminate in 4.

TABLE 3

Terminations of palmar main-lines D, C, B and A in percentages

	Male (n=65)			Female (n=62)		
Position	L	R	L+R	L	R	L+R
			Line—D			
7	43.08	24.62	33.85	37.10	37.10	37.10
8	3.08	3.08	3.08	—	1.61	0.81
9	30.77	13.84	22.30	38.71	17.74	28.23
10	4 61	10.77	7.69	1.61	3.23	2.42
11	18.46	47.69	33.08	22.58	40.32	31.44
			Line—C			
5″	32.30	16.92	24.62	32.26	27.42	29.84
6	3.08	3.08	3.07	—	1.61	0.81
7	33.85	16.92	25.38	33.87	27.42	30.64
8	3.08	—	1.54	—	—	—
9	27.69	53.84	40.77	32.26	40.33	36.29
10	—	4.61	2.32	—	—	—
11	—	3.08	1.54	—	—	—
x	—	1.54	0.77	1.61	3.22	2.42
			Line—B			
4	16.93	3.08	10.00	11.29	9.68	10.49
5′	12.31	6.15	9.23	3.23	11.29	7.25
5″	44.61	32.31	38.46	59.67	37.10	48.38
6	1.54	3.08	2.31	—	1.61	0.81
7	23.07	46.15	34.62	19.36	27.42	23.39
8	—	3.08	1.54	—	—	—
9	1.54	6.15	3.84	6.45	12.90	9.68

(Table 3 contd.)

Line—A

Position	Male (n=65) L	R	L+R	Female (n=62) L	R	L+R
1	1.54	—	0.77	—	—	—
2	3.08	—	1.54	3.23	1.61	2.42
3	64.62	32.31	48.46	69.35	53.22	61.30
4	23.07	46.15	34.62	25.81	40.33	33.06
5′	7.69	21.54	14.61	1.61	4.84	3.22

TABLE 4

Main-line indices of the Mundas

Sex	No. of palm-prints R	L	Main-line index R	L	R+L	Transversality
Male	65	65	8.43	6.92	7.68	21.82%
Female	62	62	7.59	6.98	7.29	8.75%

The main-line indices and differences in transversality in the male and female Mundas have been presented in Table 4. The average main-line index is 7.68 for males and 7.29 for females. Among the Onge (Gupta & Basu 1960) the average main-line index is 7.39 for males and 7.11 for females.

The degrees of transversality have been calculated from the main-line indices. If is found that transversality is 21.82%, more pronounced in the right palms in males and 8.75% in females. The greater transversality in the right hand in both sexes is quite in agreement with the general findings of other populations.

The frequency of patterns in the hypothenar area is presented in Table 5.

TABLE 5

Pattern frequency in the hypothenar region of the Mundas

Patterns	Male (n=65)						Female (n=62)					
	L	%	R	%	L+R	%	L	%	R	%	L+R	%
A^c	1	1.54	2	3.08	3	2.31	—	—	—	—	—	—
A^u	43	66.16	45	69.23	88	67.70	40	64.52	42	67.74	82	66.13
A^u/A^c	8	12.30	7	10.77	15	11.54	6	9.58	3	4.84	9	7.26
L^r/A^c	1	1.54	1	1.54	2	1.54	—	—	—	—	—	—
L^u/A^c	3	4.61	1	1.54	4	3.07	2	3.23	2	3.23	4	3.23
L^u/A^u	3	4.62	—	—	3	2.31	1	1.61	1	1.61	2	1.61
L^r/A^u	—	—	2	3.08	2	1.54	—	—	—	—	—	—
L^r	4	6.15	3	4.61	7	5.38	7	11.29	6	9.68	13	10.48
L^u	2	3.08	4	6.15	6	4.61	4	6.45	4	6.45	8	6.45
L^c	—	—	—	—	—	—	—	—	1	1.61	1	0.81
W	—	—	—	—	—	—	1	1.61	2	3.23	3	2.42
S	—	—	—	—	—	—	1	1.61	1	1.61	2	1.61

It is apparent from Table 5 that the majority of hypothenar configuratious are plain arches. The frequencies of the following patterns are included in the pattern types ; one loop, either alone or in company with plain arch ; whorl and S-pattern. Loop either alone or in combination occurs in 18.75% palms in males and in 22.58% palms in females. Whorl and S-pattern occur only in females, with a frequency of 2.42% and 1.61%respectively.

The frequency of the Thenar/I interdigital area pattern is presented in Table 6.

TABLE 6

Pattern frequency in the Thenar/I interdigital region of the 127 Mundas

Pattern	Male (n=65)						Female (n=62)					
	L	%	R	%	L+R	%	L	%	R	%	L+R	%
O	50	76.93	57	87.70	107	82.31	55	88.71	58	93.54	113	91.13
L^r	—	—	—	—	—	—	1	1.61	1	1.61	2	1.61
L^c /L^r	4	6.15	4	6.15	8	6.15	1	1.61	—	—	1	0.81
V	10	15.38	4	6.15	14	10.77	4	6.45	1	1.61	5	4.03
L^c	1	1.54	—	—	1	0.77	1	1.61	2	3.23	3	2.42

It is observed from Table 6 that 6.92% loops occur in males and 4.84% in females. High percentage of patternless configurations is obtained in both sexes.

TABLE 7

Pattern frequency in the II, III and IV interdigital region in combination

Combination	Male (n=65)						Female (n=62)					
	L	%	R	%	L+R	%	L	%	R	%	L+R	%
0-0-0	8	12.31	11	16.92	19	14.60	24	38.71	19	30.65	43	34.68
0-0-L	42	64.62	22	33.85	64	49.23	24	38.71	24	38.71	48	38.71
0-L-L	4	6.15	3	4.61	7	5.39	9	14.51	6	9.68	15	12.09
0-L-0	10	15.38	25	38.46	35	26.93	3	4.84	11	17.74	14	11.30
L-L-L	1	1.54	2	3.08	3	2.31	—	—	—	—	—	—
L-0-0	—	—	2	3.08	2	1.54	—	—	—	—	—	—
0-L-W	—	—	—	—	—	—	1	1.61	1	1.61	2	1.61
0-0-W	—	—	—	—	—	—	1	1.61	1	1.61	2	1.61

Table 7 shows the frequency of the three interdigitals II. III and IV in combination. The combination 0-0-L occurs more frequently in both sexes. It is 49.23% in males and 38.71% in females.

An attempt is also made to classify the patterns in the interdigital regions. It is noticed from Table 7, that the second interdigital area exhibits lowest percentage of patterns. Of the three interdigital areas, the third interdigital area presents 34 63% and 25% of palms with pattern in males and females respectively. In the fourth interdigital area, loop is the most common type of pattern. The patterns occur in 56.93% in males and 54.02% in females. Whorls are confined to females only (3.22%).

TABLE 8

Frequencies of types and combinations of axial triradii

Types	Male (n=65)						Female (n=62)					
	L	%	R	%	L+R	%	L	%	R	%	L+R	%
t	42	64.62	44	67.69	86	66.15	39	62.90	39	62.90	78	62.90
t'	18	27.69	16	24.61	34	26.15	13	20.97	15	24.19	28	22.58
t''	—	—	1	1.54	1	0.77	1	1.61	1	1.61	2	1.61
tt'	2	3.08	2	3.08	4	3.08	5	8.06	6	9.68	11	8.87
tt''	2	3.08	1	1.54	3	2.31	2	3.23	—	—	2	1.61
t't''	1	1.54	1	1.54	2	1.54	—	—	—	—	—	—
tt't''	—	—	—	—	—	—	2	3.23	1	1.61	3	2.43

Table 8 presents the various types of axial triradius. It is observed that the majority of the palms in both sexes possess only one triradius which is situated at the base of the palm and classified as *t*. In occurs in 66 15% in males and 62.90% in females. Among the combination of two triradii, tt' occurs more frequently than *t' t"* and *tt"*. Combination of three axial triradii *tt' t"* is limited to females only, with a frequency of 2.43%.

Comparision with Other Tribal Populations

In Table 9, the findings of the true patterns in various palmar zones have been compared with the data of other tribal populations of India. Bisexual variation in pattern frequency is observed in the different tribes. Among all the tribes, patterns are found in highest intensity in the fourth interdigital area and in lowest intensity in the second interdigital area.

Hypothenar area : In the hypothenar area, frequency of pattern in various groups varies from 6.90% among Nayadi females to 35.72% among Pahira females. Males exhibit considerably higher frequency of patterns among the Nayadi and Urali, and the females possess more patterns among the Pahira and Munda. Among the Kadar, Santal and Khasi bisexual variations in pattern frequency in the hypothenar area are very small. The Munda possess almost the same pattern frequencies as found among the Kadar, Santal and Riang but slightly higher than the Khasi, Pahira and lower than the other groups. In pattern frequencies in the hypothenar area, they do not differ much from the Mongoloid tribes of Khasi and Riang,

TABLE 9

Percentage of palm-print patterns in different tribal populations

Tribe	Sex	No.	Hypothenar	Thenar/I Interdigital area	Interdigital area II	Interdigital area III	Interdigital area IV	Author	
Paniyan	M	18	13.88	5.56	19.45	52.78	66.67	Chakravartti	1958
Nayadi	M	23	23,92	8.70	2.17	52.17	52.17	Chakravartti	1958
	F	29	6.90	12 07	1.72	39.66	49.99	Chakravartti	1958
Pahira	M	33	16.68	10.61	6.06	28.78	59.39	Chakravartti	1959
	F	21	35.72	—	2.38	16.66	21.43	Chakravartti	1959
Kadar	M	80	22.6	10.2	1.2	18.9	57.8	Chakravartti	1959
	F	65	24.1	19.4	—	14.0	60.5	Chakravartti	1959
Urali	M	60	32.77	10.08	1.68	21.84	50.42	Chatterjee *et. al*	1960
	F	24	22.91	4.17	—	20.83	56.25	Chatterjee *et. al*	1960
Santal	M	62	23.59	9.76	6.50	26.82	56.10	Chakravartti	1960
	F	61	22.32	9.92	7.44	31.41	52.89	Chakravartti	1960
Khasi	M	100	19.50	6.50	5.00	28.50	67.00	Deka Mohapatra	1967
	F	100	20.18	10.10	4.43	22.12	76.44	Deka Mohapatra	1967
Riang	M F	100	23.0	13.0	2.0	19.5	74.5	Gupta	1966
Tippera	M F	144	27.7	5.6	2.1	18.4	76.6	Gupta	1966
Munda	M	65	18.45	6.92	3.85	54.63	56.93	Present study	
	F	62	26.61	4.84	—	25.00	54.02	Present study	

Thenar and first interdigital areas : Patterns in this area are not so abundant as in the case of the hypothenar area. The frequencies of pattern in various tribes vary from 4.17% among the Urali females to 19.4% among the Kadar females. Significant bisexual variation in pattern frequency is not present among the Mundas, but it is present among the Nayadi, Urali and Khasi. The Munda compared to other tribal populations exhibit lower incidence of patterns. They exhibit almost the same frequency of patterns as found in the case of Paniyans and Tipperas. The majority of the Protoaustraloid tribes exhibit higher incidence of patterns than the Munda.

Second, third and fourth interdigital areas : Patterns in the second interdigital area are much less than in the other interdigital areas. Among all the tribes the pattern incidence increases from second to third and then to fourth interdigital areas. The Paniyan show exceptionally high incidence of pattern in second interdigital area. The female Mundas do not exhibit any pattern in second interdigital area. The male pattern-frequency is within the range of variation met with among the different Protoaustraloid tribes.

The frequency of patterns found in the third interdigital area among the Munda are also within the range of variation of the trait among the Protoaustraloid tribes. The frequency of pattern is similar to that found among the Santal, but lower among than the Paniyan, Nayadi and higher than among the Pahira, Kadar and Urali.

The patterns in the fourth interdigital area vary considerably among the Protoaustraloid tribes. The frequency of pattern is higher among the Mongoloid tribes. The Munda do not present any significant bisexual difference in frequency of patterns in this area. They are in close proximity to the Santal as regards the frequency of patterns in fourth interdigital areas.

Conclusion

The Munda exhibit bisexual variation in the pattern frequencies in hypothenar and third interdigital areas. But no

sexual difference is observed in pattern frequencies in thenar and first interdigital area, and in fourth interdigital area. It has been observed that the Munda bear close affinity with the Santal as regards the pattern incidence in hypothenar, third and fourth interdigital areas. But when the thenar and first interdigital area and second interdigital areas are considered, the Munda are found to bear differences from all other Protoaustraloid peoples.

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APICAL DERMAL CONFIGURATION OF THE BIRHOR AND ASURA

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(Received on 17 June 1969)

Abstract : The summary of results relating to the apical dermal configurations in a sample of the semi-nomadic Birhor of the Ranchi district is presented here for the first time. The results are compared with that of a sample of the traditionally iron-smelting Asura inhabiting the Netarhat Plateau. The samples are, however, small and insufficient for any conclusion, but there are no indications that the two tribes differ in respect of this trait.

DURING April 1962, an anthropological investigation was conducted among the Birhor and Asura tribal populations of the Ranchi district, Bihar. The Birhor are distributed in the Chotanagpur Division, especially in the districts of Hazaribagh, Ranchi, and Singhbhum. Approximately a little more than half of the Birhor population lives in the Hazaribagh district alone. The Asura inhabit the Netarhat Plateau in Chotanagpur.

The Birhor are semi-nomads. They have no permanent bondage with soil, as a result they have no permanent settlements. They move continuously from one place to another, but occasionally set up temporary settlements which may range in duration from a couple of days to 3/4 months. Their main economy is rope-making. The rope is spun out from the inner bark of *Bauhinia Vahlii,* which is bartered for food-stuffs. The total number of Birhor in Bihar is 2,438 (1,233 in Hazaribagh, 947 in Ranchi, 257 in Singhbhum and one in Palamau district).

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Traditionally, the Asura are an iron-smelting tribe, who have very recently switched over to agriculture as their main occupation. Even two decades ago, they used to extract iron-ore for smelting. Recently in December 1968, we had again the opportunity of exploring intensively the Asura country at Dhaja Pahar (3,500 ft. above sea-level) and also those settlements which are now deserted but had been in occupation by the Asura in the past, where positive evidence of smelting industry is still present. According to the 1961 Census, their total number is 5,819 (4,099 in Ranchi, 804 in Palamau and 16 in Purnea district).

Both the Birhor and Asura speak different dialects belonging to the Kherwari group of the Munda or the Kolarian branch of the Austro-Asiatic languages.

In the present note, the results of apical dermal configurations of the Birhor are presented for the first time and compared with those of the Asura. Mention may be made here that in earlier occasions detailed analysis of the anthropometric characters (Gupta & Dutta 1963) and finger print pattern configurations (Dutta & Gupta 1967) of the Asura have been offered. The Birhor data consist of 38 individuals (15 male and 23 female) who could be investigated at the settlements of Beti (off Banari) and Johangottua (off Bishunpur), establised by the State Multipurpose Block Development Project. Cummins and Midlo's (1943) instructions were followed in collecting the prints employing printers ink. The prints were classified according to the standard system of Galton's three-fold classification. The essential results are summarized in Tables 1 through 4.

In Table 4 the results do not indicate any difference between the samples, except the apparent difference between the males of Birhor and the males of Asura, which lies on the verge of 5 per cent point of t-distribution. Much emphasis may not be laid on this result, as the sample sizes are small and incongruous.

It may not be out of place to mention that in the forest-clad undulating rocky plateau of Chotanagpur many tribes having different dialects and languages bear biological

similarity (Dutta and Gupta 1967, 258). In a later publication Sen (1967, 6) has also pointed out that the tribes speaking Mundari and Dravidian languages are not necessarily differentiat on the basis of ABO blood group distribution.

How far the apparently diverse tribal populations of Chotanagpur, living in a common ecological niche but speaking differential languages, are biologically connected is a moot problem of physical anthropology today.

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TABLE 1

Finger-wise distribution of principal papillary patterns

Birhor

Patterns	LI	LII	LIII	LIV	LV	RI	RII	RIII	RIV	RV
Male										
Whorl	46.67	40.0	53.33	73.33	20.0	73.33	73.33	60.0	93.33	40.0
Loop U	53,33	33,33	46.67	26.67	80.0	26.67	20.0	40.0	6.67	60.0
Loop R	—	26.67	—	—	—	—	67.67	—	—	—
Arch	—	—	—	—	—	—	—	—	—	—
Female										
Whorl	47.83	39.13	34.78	47.83	8.70	60.87	69.57	39.13	73.91	26.09
Loop U	43.48	56.52	56.52	52.17	91.30	34.78	21.74	60.87	26.09	73.91
Loop R	—	4.35	8.70	—	—	—	4.35	—	—	—
Arch	8.70	—	—	—	—	4.35	4.35	—	—	—

Asura

Male										
Whorl	38.20	47.19	29.55	40.45	8.99	52.27	47.19	28.09	50.56	16.85
Loop U	53.93	41.57	68.18	58.43	91.01	40.91	37.08	66.29	49.44	83.15
Loop R	6.74	7.87	2.27	1.12	—	4.55	12.36	2.25	—	—
Arch	1.12	3.37	—	—	—	2.27	3.37	3.37	—	—
Female										
Whorl	44.19	38.10	27.91	32.56	2.32	37.21	37.21	23.26	41.86	2.32
Loop U	51.16	42.86	67.44	65.11	93.02	53.49	46.51	74.42	53.49	93.02
Loop R	4.65	11.90	—	2.32	—	4.65	4.65	—	4.65	2.32
Arch	—	7.14	4.65	—	4.65	4.65	11.63	2,32	—	2.32

TABLE 2

Digitwise distribution of principal pattern types

(R and L combined)

Birhor

	Male					Female				
Digits	I	II	III	IV	V	I	II	III	IV	V
	(n=30)	(n=30)	(n=30)	(n=30)	(n=30)	(n=46)	(n=46)	(n=46)	(n=46)	(n=46)
Patterns										
Whorl	60.0	56.67	56.67	83.33	30.0	54.35	54.35	36.96	60.87	17.39
Loop U	40.0	26.67	43.33	16.67	70.0	39.13	39.13	58.70	39.13	82.61
Loop R	—	16.67	—	—	—	—	4.35	4.35	—	—
Arch	—	—	—	—	—	6.52	2.17	—	—	—

Asura

	Male					Female				
	(n=177)	(n=178)	(n=177)	(n=178)	(n=178)	(n=86)	(n=85)	(n=86)	(n=86)	(n=86)
Whorl	45.20	47.19	28.81	45.50	12.92	40.70	37.65	25.58	37.21	2.32
Loop U	47.46	39.32	67.23	53.93	87.08	52.32	44.70	70.93	59.30	93.02
Loop R	5.65	10.11	2.26	0.56	—	4.65	8.23	—	3.49	1.16
Arch	1.69	3.37	1.69	—	—	2.32	9.41	3.49	—	3.49

TABLE 3

Handwise distribution of principal papillary patterns

Birhor

Patterns	Male			Female		
	L. Hand	R. Hand	L and R combined	L. Hand	R. Hand	L and R combined
Finger	(n=75)	(n=75)	(n=150)	(n=115)	(n=115)	(n=230)
Whorl	46.67	68.00	57.33	35.65	53.91	44.78
Loop U	48.0	30.67	39.33	60.0	43.48	51.74
Loop R	5.33	1.33	3.33	2.61	0.87	1.74
All Loop	53.33	32.0	42.67	62.61	44.35	53.48
Arch	—	—	—	1.74	1.74	1.74

Asura

	Male			Female		
Finger	(n=444)	(n=444)	(n=888)	(n=214)	(n=215)	(n=429)
Whorl	32.88	38.96	35.92	22.47	28.37	28.67
Loop U	62.61	55.41	59.01	64.02	64.19	64.10
Loop R	3.60	3.83	3.72	3.74	3.26	3.50
All Loop	66.21	59.24	62.73	67.76	67.45	67.60
Arch	0.90	1.80	1.35	3.27	4.19	3.73

TABLE 4

Index of pattern intensity and its significanee

Population	N	Pattern intensity index		Test of Significance in Mean P. I. I.		
		Mean ± S.E.	S.D. ± S.E.	Groups compared between	Value of 't'	Probability
Birhor				*Birhor*		
Male	15	15.47 ± 0.51	1.96 ± 0.36	Male and Female	1.20	Not significant
Female	23	14.30 ± 0.71	3.39 ± 0.50			
Asura				*Asura*		
Male	89	13.61 ± 0.34	3.24 ± 0.24	Male and Female	1.45	Not significant
Female	43	12.74 ± 0.48	3.16 ± 0.34			
				Birhor Male and Asura Male	2.15	Significant
				Birhor Female and Asura Female	1.86	Not significant

For n = ∝ t = 1.96 at 0.05 level.

RELATIVE LENGTHS OF THE FIRST AND SECOND TOES OF DIFFERENT POPULATIONS OF ASSAM

PRIYA BALA DAS

(Received on 4 November 1969)

Abstract : The relative lengths of the first and second toes of some caste populations of Assam, namely, Brahman, Kalita, Vaishya, Kaibarta and Hira have been compared with those of the following Mongoloid tribes, Khasi, Mikir and Rabha of Assam. Significant differences have been observed between the caste population and the Mongoloid population.

Introduction

A good deal of variation in the three different types of foot, namely, T, where the first toe is longer than the second toe ; F, where the second toe is longer than the first toe and O, where both the toes are of equal length, is noticeable in different populations.

In the present study, the relative lengths of the different toes as found among the four endogamous castes of Assam, namely, Brahman, Kalita, Vaishya and Kaibarta have been shown. The frequencies of the different homo and hetero-types of all the groups have also been dealt with.

The present data have been compared with those on some Mongoloid tribes of Assam, namely, Khasi (Das and Uzir 1961), Rabha (Das and Uzir 1959) and the Mikir (Das and Das 1968) and also with the Hira (Das and Das 1967), a pottery-making caste of Assam.

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Material and Method

A total of 1066 individuals, comprising 396 males and 670 females, were collected during the years 1960-62 from different educational institutions in the district of Kamrup, Assam. The contour method described by Sarkar (1958) has been applied in collecting the data. Children above 14 years of age have been included in the present investigation.

Results and discussion

Tables 1 and 2 show the frequency of three types of foot among the different populations of Assam. It is seen (Table I) that T-type of foot occurs in the highest frequency among all the groups irrespective of sex. Of all the male groups, the frequency of T-type occurs in the highest frequency among the Kalita (92.3%) and in the lowest frequency among the Brahman (83.8%). The frequency of this type of foot among the Vaishya and the Kaibarta are 84.7% and 85.6% respectively.

TABLE 1

Relative lengths of the 1st and 2nd toes

		Right			Left			Combined		
	No.	T %	F %	O %	T %	F %	O %	T %	F %	O %
Male										
Brahman	71	85.9	7.0	7.0	81.6	9.8	8.4	83.8	8.4	7.7
Kalita	130	90.7	7.6	1.5	93.8	0,8	5.3	92.3	4.2	3.4
Vaishya	108	84.2	11.1	4.6	85.1	5.5	9.2	84.7	8.3	6.9
Kaibarta	87	81.6	12.6	5.7	89.6	9.1	1.1	85.6	10.9	3.4
Female										
Brahman	154	88.9	7.7	3.9	87.0	8.4	4.5	87.9	8.1	3.8
Kalita	345	87.5	6.3	6.1	90.7	4.6	4,6	89.1	5.5	5.3
Vaishya	53	83.0	9.4	7.5	86.8	9.4	3.7	84.9	9.4	5.6
Kaibarta	118	88.1	6.7	5.1	88.9	4.2	6.7	88.5	5.5	5.9

TABLE 2

Comparison of data among different populations

	No. of individuals	T %	F %	O %	Author
Male					
Brahman	71	83.8	8.4	7.7	Present study
Kalita	130	92.3	4.2	3.4	do.
Vaishya	108	84.7	8.3	6.9	do.
Kaibarta	87	85.6	10.9	3.4	do.
Hira	76	88.8	3.2	7.8	Das and Das (1967)
Mikir	120	80.4	8.7	10.8	do. (1968)
Khasi	56	87.5	7.1	5.3	Das and Uzir (1961)
Rabha	300	69.6	16.5	13.8	do. (1959)
Female					
Brahman	154	87.9	8.1	3.8	Present study
Kalita	345	89.1	5.5	5.3	do.
Vaishya	53	84.9	9.4	5.6	do.
Kaibarta	118	88.5	5.5	5.9	do.
Hira	105	87.6	7.6	4.7	Das and Das (1967)
Mikir	100	82.5	13.3	3.9	do. (1968)
Khasi	62	76.6	8.1	15.3	Das and Uzir (1961)
Rabha	300	72.6	18.3	9.0	do. (1959)

Among the females also. the Kalita show the highest frequency (89.1%) of T-type of foot, followed by the Kaibarta (88.5%) and the Brahman (87.9%). The Vaishya females show the lowest frequency (84.9%).

Sex-wise comparison of T-type of foot shows that the percentage is higher among the Kalita male (92.3%) than among their female counterparts (89.1%) ; whereas the Brahman and the Kalita females show higher frequeney of T-type of foot than the males. Percentage of occurrence is equal among the Vaishya males (84.7%) and Vaishya females (84.9%).

F-type of foot occurs in the next highest freqency among all the males, though the difference between F and O types of foot is slight among all the three groups, excepting the Kaibarta. Among the latter group, the F-type is almost three times more (10.9%) than the O-type (3.4%).

The Kalita and the Kaibarta females show F and O types of foot in equal percentages (Kalita, F = 5 5%, O = 5.3%); Kaibarta (F = 5.5%, O = 5.9%); whereas among the Brahman (F = 8.1%. O = 3.8%) and the Vaishya (F = 9.4%, O = 5.6%), F-type occurs in higher frequency than the O-type.

The frequency of the type F is found to be higher among the Kalita and the Vaishya females than among their male counterparts ; while the reverse is noticed among the Kaibarta. It is almost double among the Kaibarta males (10.9%) than among females (5.5%). Among the Brahman, F-type occurs almost in equal percentage, being 8.4% in males and 8.1% in females.

Table 3 shows that statistically significant difference does not exist between intercaste groups. The three tribes, the Khasi, Rabha and Mikir also do not show significant difference (Das and Das 1968). So, all the caste groups have been combined together and compared with the pooled data of the Mongoloid tribes.

TABLE 3

Value of Chi-square Test

Male	Chi-square Test	d. f.	Probability	Remarks
Brahman × Kalita	6.52	2	0.02>P>0.05	Non significant
Brahman × Vaishya	0.34	2	0.80>P>0.90	do.
Brahman × Kaibarta	3.25	2	0.10>P>0.20	do.
Brahman × Hira	3.57	2	0.10>P>0.20	do.
Kalita × Vaishya	7.04	2	0.02>P>0.05	do.
Kalita × Kaibarta	0.89	2	0.50>P>0.70	do.
Kalita × Hira	4.11	2	0.10>P>0.20	do.
Vaishya × Kaibarta	2.90	2	0.20>P>0.30	do.
Vaishya × Hira	4.56	2	0.10>P>0.20	do.
Kaibarta × Hira	8.96	2	0.01>P>0.02	do.
All Castes × Tribes	54.6	2	P>0.01	Significant

Table 3 (contd.)

Female	Chi-square Test	d. f.	Probability	Remarks
Brahman × Kalita	4.23	2	0.10>P>0.20	Non significant
Brahman × Vaishya	0.81	2	0.50>P>0.70	do.
Brahman × Kaibarta	2.52	2	0.20>P>0.30	do.
Brahman × Hira	0.30	2	0.80>P>0.90	do.
Kalita × Vaishya	2.66	2	0.20>P>0.30	do.
Kalita × Kaibarta	0.11	2	0.90>P>0.95	do.
Kalita × Hira	1.66	2	0.30>P>0.50	do.
Vaishya × Kaibarta	1.78	2	0.30>P>0.50	do.
Vaishya × Hira	0.26	2	0.80>P>0 90	do.
Kaibarta × Hira	1.40	2	0.30>P>0.50	do.
All Castes × Tribes	71.50	2	P>0.01	Significant

It is found in Table 4 that in both the populations T-type occurs predominantly but the frequency is higher in case of the caste population (male 87.5%, female 88.3%). than among the tribal population (male 79.2%, female 77.2%). F-type of foot occurs in the next highest frequency in both the populations. It is seen that the Mongoloid males and females show higher frequency of F and O type than the caste populations. It is also revealed from the table that while the F-type of foot occurs in higher frequency among the Mongoloid females (13.4%) than among their male counterparts (10.8%), the caste populations show almost equal frequency in both the sexes (male 6.9%, female 6.6%). The values of chi-square (Table 3) show that the Assamese caste population differs significantly from the Mongoloid tribes in the relative lengths of the toes.

TABLE 4

Comparison of pooled data

Male	No. of individuals	T %	F %	O %
Assamese caste-population	472	87.5	6.9	5.6
Mongoloid	476	79.2	10.8	10.0
Female				
Assamese caste population	775	88.3	6 6	5.1
Mongoloid	462	77.2	13.4	9.4

Homotype and Heterotype

It appears from Table 5 that the homotype TT occurs in the highest frequency in all the groups. It is highest among the Kalita male (89.2%) which is followed by the Vaishya (82.4%), the Hira (80.2%), the Kaibarta (79.3%) and the Brahman (76.1%) males. Of all the female groups, the homotype TT occurs in the highest frequency among the Brahman (85 7%) and in the lowest frequency among the Vaishya (79.2%).

TABLE 5

Frequency of homotype and heterotype

Male People	No	TT %	FF %	OO %	TF %	FT %	TO %	OT %	FO %	OF %
Brahman	71	76.1	7.0	5.6	4.1	2,8	2.8	1,4	—	—
Kalita	130	89.2	0.8	1.5	—	4.6	1.6	—	2.3	—
Valshya	108	82,4	5.6	4.6	—	2.8	1.8	—	2.8	—
Kaibarta	87	79.3	4.6	2.3	2.3	6.8	—	3,4	—	1.2
Hira	76	80.2	—	1.3	2.6	2.6	9.2	2,6	1.3	—
Mikir	120	72.5	2.5	2.5	3.3	2.5	7.5	2.5	4.1	2.5
Khasi	56	80.3	3.5	—	3.7	3.5	8.9	—	1.7	—
Rabha	300	60.3	10.6	5.6	3.0	4.0	3.6	7.6	4.3	0.6

Table 5 (contd.)

Female

People	No	TT %	FF %	OO %	TF %	FT %	TO %	OT %	FO %	OF %
Brahman	154	85.7	7.1	1.3	1.3	—	2.6	1,3	0.6	—
Kalita	345	84.1	3.2	0.8	0.8	2,0	2.6	4,6	1,2	0.6
Vaishya	53	79.2	7,5	—	—	1.9	3,8	5.6	—	1,9
Kaibarta	118	84.7	2.5	3.4	1.7	2.5	1.7	1.7	1.7	—
Hira	105	80.9	1.9	0.9	5.7	2.8	1.9	2.8	0.9	1,9
Mikir	100	76.0	6.0	2.0	6.0	6.0	1.0	—	—	3.0
Khasi	62	69.3	3.2	6.4	1.6	6.4	6.4	3.3	1.6	1.6
Rabha	300	63.0	11.0	2.6	3.6	7,0	4.3	4.3	2.3	1.6

Thc frequency is almost equal among the Kalita (84.1%) and the Kaibarta females (84.7%). The Hira females show 80.9% of this type of foot. The homotype FF occurs in the next highest frequency among the Brahman males (7.0%) and females (7.1%) and Vaishya males (5.6%) and females (7.5%). While FT-type of foot occurs in the next highest frequency among the Kalita (4.6%) and the Kaibarta (6.8%) males, OT, OO and TF occur among the Kalita (4.6%), the Kaibarta (3.4%) and the Hira (5.7%) females respectively. The Hira males show TO-type of foot in the next highest frequency (9.2%). The homo-type OO appears to be very rare, only 14 males and 11 females possess this type of foot. Of all the heterotypes OF-type occurs very rarely. While Kaibarta males show 1.2% of this type of foot, the Vaishya and the Kalita females show 1.9% and 0.6% respectively.

Among the tribal population, also, homotype TT occurs in highest frequency, but its frequency is lower than that of the caste population excepting the Khasi males. Only 60.3% of TT-type occurs among the Rabha males and 63.0% among the Rabha females. Like the Assamese caste population, the Mongoloid males show OF-type in the lowest frequency. On the other hand, heterotype FO occurs in the lowest frequency among the Mongoloid females.

Summary

The relative lengths of the first and second toes are shown among different caste populations of Assam. The data have been compared with the data on some Mongoloid tribes of Assam. The frequency of T-type of foot is found to occur in the highest frequency among all the groups and in both the sexes. F-type of foot occurs more frequently among the Kalita, Vaishya, Hira and all the Mongoloid females than among their male counterparts, while Brahmans show almost equal frequency in both the sexes. On the other hand, the Kaibarta male present higher frequency of F-type of foot than the females, being 10.9% and 5.5% respectively.

While pooled data of the Mongoloid females (13.4%) show higher frequency of the F-type of foot than the males (10.8%), pooled data for Assamese males and females show almost equal percentage, being 6.9% and 6.6% respectively.

Homotype TT occurs in the highest frequency among all the groups, though the frequency is much lower among the Mongoloids than among the caste populations. Homotype OO appears rarely. Of all the heterotypes, OF-type is found to be very rare among all the groups.

The intercaste comparison shows no significant differences. The chi-square value reveals that statistically significant difference exists between the Assamese caste population and the Mongoloids (Table 4).

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ANTHROPOMETRY OF THE KORKUS OF MELGHAT FOREST

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(*Received on 19th February 1970*)

Abstract : The purpose of this communication is to present anthropometric characteristics of the Korku of the Melghat forest region. Besides, a comparison of the present Korku series with earlier measurements on Korku of the same geographical location has been made.

A series of classical anthropometric characters for Korkus of Melghat forest region in Amraoti district, Maharashtra, were taken in February 1963. The measurements were made on fifty adult male individuals, apparently between the ages of twenty and sixty. Although the primary purpose of this article is simply to present the anthropometric data of Korkus, a comparison of the present Korku series with those of earlier measurements on Korkus of the same geographical location by Chattopadhyay (Chottopadhyay 1952) may be of some interest. The comparison between Chattopadhyay's Korku study and the present Korku study is based on the following anthropometric characters and indices, for which the technique of measuring is identical in both studies : stature, head length, head breadth, bizygomatic breadth, bigonial breadth, total facial height, nasal breadth, cephalic index, total facial index, and nasal index. In both studies measurements were undertaken in accordance with Martin's definition (Martin 1928). Chattopadhyay measured 50 adult Korku male

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individuals in Melghat Taluq in the year 1941. His data on Korku are presented in Table 2.

The average, range, standard deviation and co-efficient of variation for each of the fourteen measurements of the Korku collected by the present author is given in Table 1. The recording of height, length and circumference was made in millimeters. Weight was determined by using a portable platform scale recording in pounds, with the pounds later being converted to kilogrammes. On examination of the table it is revealed that standard deviation and co-efficient of variation of each character and index of the present sample exhibits no unusual characteristics in variability as different from a normally homogeneous population.

Body Measurements

Korku are below medium to medium in stature. The mean height is 1620.60 mm. The average sitting height amounts to 808.88 mm, ranging between 721-868 mm. The relative sitting height index gives an indication of the relation of length of the trunk as compared to the rest of the body. It appears from the distribution of relative sitting height index that the Korku males are grouped in the range of hyper-makroskel to mesatiskel class, the mean relative sitting height index being 49.92. The average body weight of the Korku is 48.51 kg. Body-build index, which gives an idea of the physical constitution, is calculated by using the following formula.

$$\text{Body-build index} = \frac{\text{wt. in grammes}}{(\text{Stature in cms.})^3} \times 100$$

It appears from the distribution of the body-build index that most of the Korku have low body-build.

Head and Face measurements

The average cephalic measurements of the Korku are medium, 182.68 mm. for length and 141.42 mm. for breadth.

In cephalic index, the majority of the Korku have been classed as mesocephals. The cephalic index comes to an average of 77.44. It is significant that the percentage of dolichocephals is quite low. In length-height relation they have hypsicephalic index (65 40).

A minimum frontal breadth of 102.10 mm. indicates somewhat narrow forehead breadth for the Korku. The facial breadth is also small as can be seen from the mean bizygomatic breadth of 133.58 mm. They tend to have a low total facial height corresponding to their short upper face. The average for total facial height is 114-40 mm. and for upper face height is 66.40 mm. These values, in combination with narrow facial breadth, yield a mean total facial index of 85.67 (Mesoprosop). The nasal index of the Korku on the average is mesorrhine. The dispersion shows preponderence of both mesorrhine and platyrrhine types of nose.

Comparison with Chattopadhyay's Korku data

In Table 3 mean differences and *t*-values between the measurements of the present Korku series and that of the earlier measurement on Korku by Chattopadhyay have been presented. The *t*-test shows significant value in the case of six variables out of the eight measurements and three indices compared, the variables being head breadth, bi-zygomatic breadth, bigonial breadth, total facial height, nasal height and nasal breadth. It is further observed that the present Korku series exceed Chattopadhay's Korku series in most of the measurements and indices compared. However, standard deviations of the two studies correspond fairly closely. It is assumed that significant differences in the six characters in the span of only twenty-two years seems not to be genetic, neither are they due to inequalities in the technique of measurement, since in both the studies Martin's technique of measurements were followed. Rather, the observed difference may be

attributed to investigator differences. To avoid such discrepancies comparison of anthropometric measurements should be carried out when the measurements were taken by the same investigator. Otherwise assessment will be unsatisfactory if the results of different investigators are compared.

Summary

Anthropometric data are presented for the Korku of Melghat forest region. The Korku can be characterized as below medium to medium in stature, mesocephalic and hypsicephalic head, mesoprosopic face with messorrhine to platyrrhine nose. A comparison of the present Korku series with earlier measurements on the Korku of the same geographical location has been made. It is observed that Korkus residing in the Melghat forest region of the Amraoti district are larger today in most of the head and facial dimensions than 22 years ago. It is suggested that comparisons of the anthropometric data should be made between the measurements taken by the same investigator.

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TABLE 1

Mean, standard deviations and co-efficient of variations of measurements on Korku adult males

Measurement	Mean ±S.E.	Range	S.D. ±S.E.	C.V. ±S.E.
1	2	3	4	5
Weight (in Kg)	48.51±0.65	58.1−37.2	4.61±0.46	9.50±0.95
Stature	1620.60±7.93	1736−1441	56.09±5.61	3.46±0.35
Sitting height	808.88±4.44	868−721	31.42±3.14	3.88±0.39
Head length	182.68±0.72	191−164	5.07±0.51	2.78±0.28
Head breadth	141.42±0.66	151−132	4.66±0.47	3.30±0.33
Auricular height	119.45±0.73	131−111	5.17±0.52	4.33±0.43
Horizontal circumference	533.18±2.01	566−496	14.24±1.42	2.67±0.27
Minimum frontal breadth	102.10±0.44	108−95	3.13±0.31	3.07±0.31
Bizygomatic breadth	133.58±0.53	143−126	3.78±0.38	2.83±0.28
Bigonial breadth	103.86±0.79	116−90	5.57±0.56	5.36±0.54
Total face height	114.40±0.88	128−102	6.19±0.62	5.41±0.54
Upper face height	66.40±0.57	75−56	4.04±0.40	6.08±0.61
Nose height	45.98±0.45	53−41	3.15±0.32	6.85±0.68
Nose breadth	38.30±0.36	44−33	2.56±0.26	6.68±0.67
Body-build index	1.14±0.01	1.36−0.91	0.10±0.01	8.77+0.88

Table 1 Contd.

Measurement	Mean ±S.E.	Range	S.D. ±S.E.	C.V. ±S.E.
1	2	3	4	5
Relative sitting height index	49.92±0.20	52.61 – 46.85	1.40±0.14	2.80±0.28
Cephalic index	77.44±0,36	83.54 – 75.00	2.58±0.26	3.33±0.33
Length/height index	65.40±0.35	69.66 – 59.38	2.46±0.25	3 76±0.38
Breadth/height index	84.53±0.60	97.74 – 74.11	4.21±0.42	4.98±0.50
Total facial index	85.67±0.63	96.97 – 76.52	4.48±0.45	5.23±0.52
Upper facial index	49.73±0.44	56.06 – 42.42	3.14±0.31	6.31±0 63
Nasal index	83.64±1.08	102.44 – 64.71	7.62±0.76	9.11±0.91

TABLE 2

Mean and standard deviation of measurements on Korku adult males measured by Chattopadhyay in 1941

Measurements (n=51)	Mean	S.D.
Stature	1636.44	53.2
Head length	180.58	5.6
Head breadth	137.82	4.6
Bizygomatic breadth	130.16	5.6
Bigonial breadth	95.44	5.7
Total face height	111.36	5.8
Nose height	48.08	3.03
Nose breadth	39.80	2.7
Cephalic index	76.40	3.04
Total facial index	85.73	5.48
Nasal index	83.14	8.64

TABLE 3

Statistical comparison of the Korkus measured in 1963 and in 1941

Measurements	$\bar{x}_1 - \bar{x}_2$	't' values
Stature	– 15.84	1.468
Head length	2.10	1.875
Head breadth	3.60	4.235*
Bizygomatic breadth	3.42	3.600*
Bigonial breadth	8.42	7.451*
Total face height	3.04	2.533*
Nasal height	– 2.10	3.281*
Nasal breadth	– 1.50	2.885*
Cephalic index	1.04	0.186
Total facial index	– 0.06	0.060
Nasal index	0.50	0.307

* Significant at 5% level of probability.

THE DISTRIBUTION OF MIDDLE-PHALANGEAL HAIR AMONG THE KAYASTHAS OF WEST BENGAL, INDIA

BALARAM DE

(Received on 30 October 1969)

Abstract: A sample of 200 unrelated individuals (100 individuals of each sex) ranging in age from 15 years and above from the caste group of Kayastha in West Bengal with respect to the distribution of middle phalangeal hairs on both the hands reveals significant sex difference. The trait is dominantly manifested in the 3rd and 4th digits. The Tentulia Bagdi, a scheduled caste, stands apart from all other groups of the same locality.

Introduction

THE distribution of hair on the middle segments of the digits or middle phalanges has received special attention of anthropologists in recent years. The frequency of the mid-phalangeal hair in different populations has been studied by many investigators.

Bernstein & Burks (1942) have shown that the trait is controlled by a set of five alleles, namely, A_0, A_1, A_2, A_3 and A_4 and the trait follows the Mendelian mode of inheritance. When sex is examined (Garn 1950, 51) it is revealed that the trait does not vary always in every group of the two sexes.

The present study offers data on middle phalangeal hair on the Kayastha, West Bengal, who are ranked below the Brahmin in caste hierarchy. As far as the author is aware there is no prior data on the M.P.H. distribution on this caste.

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Material and Method

The data (N = 200, male 100 and female 100) on the middle-phalangeal hair were collected from among the Kayastha caste in Calcutta. The distribution of hair on the middle segments of the digits on both hands of 200 unrelated individuals were observed in both sexes. The primary occuption of males is service and business, while the majority of the females are engaged in household work. The subjects who were examined mostly belonged to 15 years and above.

The presence and absence of hairs on the middle phalanges of both the hands of each individual were detected by means of a magnifying lens. The persons examined were mostly free from skin diseases.

Results and Discussion

TABLE 1

Distribution of middle-phalangeal hair among the Kayasthas, in respect of both left (L) and right (R) hands separately

Group	N	Hand	Digits with middle phalangeal hair						
			None	IV,	III	III+IV	IV+V	III+IV+V	II+III+IV+V
Male Kayastha	100	R	42	9	2	30	4	9	4
		L	42	10	2	29	3	10	4
Female Kayastha	100	R	57	5	3	15	3	12	5
		L	57	5	3	15	3	13	4

Table 1 shows that the incidence of middle phalangeal hair does not occur in an identical manner on both the hands. There is a slight difference in the distribution of the trait on the affected digit combinations between the two hands.

TABLE 2

Symmetry of left and right hands in respect of combinations of digits with mid-phalangeal hair among the Kayastha

Identical digit combinations of both hands of the individual	Male		Female		Total	
	N	%	N	%	N	%
O	39	39.0	54	54.0	93	46.05
IV	8	8.0	5	5.0	13	6.5
III	2	2.0	2	2.0	4	2.0
III–IV	28	28.0	13	13.0	41	20.5
IV–V	3	3.0	3	3.0	6	3.0
III–IV–V	8	8.0	12	12.0	20	10.0
II–III–IV–V	4	4.0	4	4.0	8	4.0
Total :	92	92.0	93	93.0	185	92.5

Table 2 shows the distribution of symmetrical combinations of digits on both hands. When the total data are considered, it shows that the symmetrical combinations occur in 92.5% of the population. But the remaining 7.5% shows asymmetry which indicates the presence of phalangeal hair either on the right or on the left hand alone. In males 92 (92%) individuals have their middle phalangeal hairs on both the hands in an identical manner, while among the females, the trait symmetry is slightly higher (93%)

TABLE 3

Homogeneity test for middle phalangeal hairs among the Brahmin, Kayastha, Gandhabanik, Tentulia Bagdi and Muslim (male) of West Bengal

Groups	Author		No. of individuals with hair	No. of individual without hair	*Chi*²	d.f.	Remark
Rarhi Brahmin ×	Bhattacharjee (1956)	191	111	80	·096 .80>P>70	1	Non-significant
Kayastha	Present	100	60	40			
Kayastha ×	Present	100	60	40	1.639		
Gandhabanik	Dutta (1963)	100	51	49	.30>P>.20	1	"
Kayastha ×	Present	100	60	40	5.047	1	Significant
Tentulia Bagdi	Kumar (1957)	121	41	80	.05>P>.02		
Kayastha ×	Present	100	60	40	3.102 .10>P>.05	1	Non-significant
Muslim	Bhattacharjee	203	100	103			

From the homogeneity test in respect of the middle phalangeal hair, it is seen in Table 3 that significant difference is found between Kayastha and Tentulia Bagdi, who possess a lower social status in the caste hierarchy, while the remaining samples do not show such significant differences when compared with the Kayastha.

Summary

100 male and 100 female data were collected from the Kayastha group, West Bengal. Out of 200, 105 (52.5%) individuals possess middle phalangeal hair on their fingers in both the hands. The incidence of middle phalangeal hair shows the significant difference ($Chi^2 = 4.511$, d.f. = 1) between male and female. This trait occurs much higher on III—IV digits than all the other combinations. When the Kayasthas are compared with other castes and Muslims of West Bengal, significant differences are observed only in the case of the Tentulia Bagdi. But the other combinations show no significant differences.

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FINGER DERMATOGLYPHICS OF SOME BENGALEE CASTES

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(*Received on 3 September 1968*)

Abstract : In order to find out the biological relationship between the caste groups of Bengal, finger dermatoglyphics of four caste groups (Brahmin, Kayastha, Vaidya and Namasudra) were utilized for quantitative and qualitative analysis. It has been found that in pattern types all the caste groups, irrespective of their sex affiliation, appear to form a homogeneous unit, while in ridge-counts too all the caste groups excepting the Vaidya males form a homogeneous unit.

Material and Method

DERMATOGLYPHIC data were collected from 795 unrelated individuals (male—387 and female—408) from the Baraset Sub-division of the district of 24 Parganas. The individuals from whom the data were collected comprise the student population of different institutions of the Sub-division and most of their parents were migrant persons, mainly from Khulna district of East Pakistan. The total data comprise 207 Brahmin (male—102, female—105), 219 Kayastha (male—113, female—106), 161 Vaidya (male—69, female—92) and 208 Namasudra (male—103, female—105) individuals.

In the present communication, the result of analysis of some of the qualitative and quantitative characters of finger dermatoglyphics has been reported ; the result of analysis of other characters of the dermatoglyphics will be reported subsequently.

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The finger patterns were formulated according to Cummins and Midlo (1961), while for the ridge-counts and other quantitative analysis Holt (1949) and Newman (1960) were followed.

Analysis

Pattern type : Percentile frequency of different finger-print patterns on individual fingers of both the hands among both the sexes of the four caste groups has been given in Table 1, while in Table 2 the percentile frequency of finger-print patterns of all the fingers and the hands combined together has been presented.

It will be seen from Tables 1 and 2 that the loops are more preponderant than any other type in both the sexes of all the groups. The Kayastha males show the highest (57.07%) while the Brahmin males show the lowest (50.41%) frequency of it. Among the female the Vaidyas show the highest frequency (62.96%) of loop. The frequency of whorl is found to be higher among the male than their female counterparts ; the Namasudras, however, stand in exception to it. Contrary to the above incidence, arch has been found to be much higher among the females compared to their male counterparts ; the Vaidyas, however, show a picture opposite to it.

Pattern type indices : The three standard pattern type of indices (Pattern intensity, Furuhata, Dankmeijer) were calculated from the pattern types and has been presented in Table 3.

It will be seen therefrom that among the male, Brahmins show the highest value (14.54) for pattern intensity index, while among the female, Namasudras show the highest value (13.83) of it.

Some amount of sexual variation has been marked with the Dankmeijer and Furuhata indices. The females show the higher indices than their respective male counterparts with regard to the Dankmeijer index, while in Furuhata index a contrary picture to the above has been found. The Vaidya and the Namasudra groups are again found to stand as an exception to the above phenomena.

Ridge-counts : The total ridge-counts for each individual were obtained by adding the ridge-counts of the ten digits. Statistical constants of ridge-counts of the four caste groups have been presented in Table 4. It will be seen therefrom that males show a higher mean than their respective female counterparts in all the caste groups. The Vaidyas again, however, show a picture opposite to it.

Bimanual difference in ridge-counts has been presented in Table 5. It appears that the Namasudra females and the Kayastha males show higher ridge-counts on the individual digits of the right hand than those of the left hand ; the Brahmin male and the Vaidya female also display the same phenomena bearing digit V. In other groups at least digit I of the right hand shows a higher mean ridge-count than that of the left hand.

Regarding the sexual difference in ridge-count it is seen from Table 6 that in the majority of cases the males show higher counts in their digits compared to those of the females, specially in the left hand. Individually digit I and IV show highest while digit II shows lowest ridge-counts in both the sexes of all the caste groups.

Discussion

It will be apparent from the above presentation that there is some variation in the distribution of pattern type among the different caste groups. In conformity with the expectation of Cummins and Midlo (1961) with regard to the incidence of arch and whorl, the sexual difference is quite apparent in almost all of the caste groups.

Newman (1960) considered the index of pattern intensity as one of the best criteria for the evaluation of the biologically meaningful difference between the groups of population. Following Newman (1960) the inter-caste variation in the pattern-intensity index was evaluated to find out the statistical significance of the mean difference between caste groups and this has been presented in Table 7.

It will be apparent from the table that the differences between the four caste groups are not statistically significant.

Similarly, the apparent sexual variation in pattern-intensity index is not also statistically significant (Table 8). Thus all the caste groups appear to form a homogeneous unit for the pattern types.

In contrast to the above phenomena, the Vaidya males show a significant difference in ridge-counts from the Brahmin and Kaystha males (Table 9). The difference in ridge-counts between the Vaidya males and the Namasudra males also reaches almost the level of significance. Contrary to the above, the difference in ridge-count between the Brahmin, Kayastha and Namasudra males, as well as the difference between the females of four caste groups, fails to reach the level of significance and thus they appear to form a homogeneous unit.

The sexual difference found in the mean ridge-counts among the four caste groups also was found to fail to reach the level of significance (Table 10) except in the case of Brahmins ($t = 3.33$).

The genetic interrelationship between upper caste groups with regard to finger dermatoglyphics, as well as the inter-relationship of the Namasudras with the upper caste groups of Bengal stands quite in agreement with the findings of serogenetical study (Sen 1960, 1962). How far the above phenomena is supported by the findings of other dermatoglyphic characters can only be revealed by subsequent work in this line.

Summary

(1) Finger dermatoglyphics of 795 individuals comprising the 207 Brahmins (male—102, female—105), 219 Kayastha (male—113, female—106), 161 Vaidya (male—69, female—92) and 208 Namasudra (male—103, female—105) were utilized for finding out the biological relationship between them.

(2) The apparent variation in pattern-type distribution found among the different caste groups fails to reach the level of significance when pattern-intensity index as a criteria was utilized. The sexual difference was also found to be statistically non-significant. Thus all the caste groups appear to form a homogeneous unit for the pattern types.

(3) In contrast to the above, the Vaidya males show a statistically significant difference with regard to ridge-counts from the other three caste groups. The differences in ridge-counts in the other three caste groups (Brahmin, Kayastha and Namasudra) fail to reach the level of significance. The females of all the caste groups and the Brahmins, Kayasthas and Namasudras thus appear to form a homogeneous unit in respect of ridge-counts.

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TABLE 1

Percentile occurrence of finger-print patterns of the four Bengalee castes

Types		Left hand I	II	III	IV	V	Right hand I	II	III	IV	V	Total
						Brahmin ♂						
Whorl	Loop	53.61	48.45	37.12	64.95	30.93	64.95	47.42	30.93	67.01	32.99	47.84
Ulnar	Loop	45.27	31.96	58.76	35.06	68.04	34.02	39.18	63.92	31.96	65.98	47.12
Radial	Loop	3.09	17.53	1.03	0	1.03	1.03	6.19	1.03	1.03	1.03	3.29
Arch		1.03	2.06	3.09	0	0	0	7.22	4.12	0	0	1.75
						Brahmin ♀						
Whorl	Loops	52.38	35.24	21.94	47.62	20.00	47.62	37.18	17.14	55.24	20.00	35.43
Ulnar	Loops	42.46	45.71	67.61	48.57	76.19	47.62	44.62	74.29	40.00	76.19	56.29
Radial	Loops	0	8.57	0.95	0	0.95	0	7.62	0	0	0	1.80
Arch		4.76	10.48	9.50	3.81	2.86	4.76	10.58	8.57	4.76	8.81	6.38

Table 1 (contd.)

Types		Left hand I	II	III	IV	V		Right hand I	II	III	IV	V	Total
							Kayastha ↗ O						
Whorl		46.78	31.19	30.28	53.63	28.44		55.96	42.20	26.61	64.22	26.61	41.19
Ulnar	} Loops	51.38	55.96	61.48	40.37	70.64		44.04	45.87	71.56	34.86	73.39	54.96
Radial	}	0.92	11.02	1.82	0	0.92		0	6.47	0	0	0	2.11
Arch		0.92	1.83	6.42	0	0		0	5.46	1.83	0.92	0	1.74
							Kayastha O +						
Whorl		48.57	47.62	31.43	53.33	23.81		54.29	44.76	19.05	48.58	23.81	39.53
Ulnar	} Loops	46.67	35.24	57.14	40.96	73.33		42.86	42.86	76.19	49.52	57.15	53.91
Radial	}	1.90	4.76	0.95	0.95	0		0.95	1.90	0.95	0.95	1.14	1.42
Arch		2.86	12.88	10.48	4.76	2.86		1.90	10.48	3.81	0.95	3.61	5.14

Table 1 (contd.)

Types		Left hand I	II	III	IV	V	Right hand I	II	III	IV	V	Total
						Vaidya ♂						
Whorl		44.62	38.46	26.16	52.31	35.38	46.15	29.23	9.23	69.23	40.00	39.08
Ulnar	Loops	50.76	41.54	66.15	46.15	64.62	50.77	52.31	81.54	30.77	60.00	54.46
Radial	Loops	0	3.08	0	0	0	0	9.23	0	0	0	1.23
Arch		4.62	16.92	7.69	1.54	0	3.08	9.23	9.23	0	0	5.23
						Vaidya ♀ +						
Whorl		43.95	29.67	16.48	49.45	24.18	49.45	34.07	15.38	56.04	25.27	34.40
Ulnar	Loops	54.95	50.55	80.22	47.25	75.82	48.35	53.85	82.42	41.76	74.73	60.99
Radial	Loops	1.10	10.99	0	1.10	0	1.10	5.49	0	0	0	1.97
Arch		0	8.79	3.30	2.20	0	1.10	6.59	2.20	2.20	0	2.64

Table 1 (contd.)

Types	Left hand I	II	III	IV	V	Right hand I	II	III	IV	V	Total
Namasudra ♂											
Whorl	51.49	41.58	22.71	61.39	24.75	57.43	36 63	16.83	68.32	35.64	41.68
Ulnar (Loops)	43.56	43.56	72.28	36.63	74.26	37.62	52.48	75.25	29.70	64.35	52.98
Radial (Loops)	0.99	7.92	0	0	0	0	4.95	1.98	1.98	0	1.78
Arch	3.96	6.94	4.95	1.98	0.99	4.95	5.94	5.94	0	0	3.56
Namasudra ♀											
Whorl	52.42	41.75	35.92	66.02	32.04	55.34	42.72	22.33	69.90	28.16	44.66
Ulnar (Loops)	40.78	36.89	56.31	29.13	66.99	44.66	40.78	73.79	30.10	70.87	49.02
Radial (Loops)	0	5.63	0	0.97	0	0	4.85	0	0	0	1.16
Arch	6.80	15.53	7.77	3.88	0.97	0	11.65	3.88	0	0.97	5.14

TABLE 2

Percentile occurrence of finger-print types (all fingures combined).

Groups		Whorl	Ulnar loops	Radial loops	Total	Arch
Brahmin	♂	47.84	47.12	3.29	50.41	1.75
Brahmin	♀	35.43	56.39	1.80	58.19	6 38
Kayastha	♂	41.19	54.96	2.11	57.07	1.74
Kayastha	♀	39.53	53.91	1.42	55.33	5.14
Vaidya	♂	39.08	54.46	1.23	55.69	5.23
Vaidya	♀	34.40	60.99	1.97	62.96	2.64
Namasudra	♂	41.68	52.98	1.78	54.75	3.56
Namasudra	♀	44.66	49.03	1.16	50.19	5.15

TABLE 3

Pattern-type indices among ihe caste groups

Groups		Pattern intensity	Dankmeijer	Furuhata
Brahmin	♂	14.54	3.68	100.87
Brahmin	♀	12.72	18.01	62.83
Kayastha	♂	13.73	4.23	74.95
Kayastha	♀	13.29	13.01	73.32
Vaidya	♂	13.26	13.38	71.75
Vaidya	♀	12.97	7.66	56.39
Namasudra	♂	13.63	8.55	78.69
Namasudra	♀	13.83	11.52	91.08

TABLE 4

Mean ridge-counts in the four caste-groups

Groups		Mean ± S. E.	S. D. ± S. E.	C. V.
Brahmin	♂	147.32 ± 4.86	46.91 ± 3.44	31.80
Brahmin	♀	125.00 ± 4.62	46.22 ± 3.26	37.29
Kayastha	♂	141.29 ± 4.01	40.33 ± 2.83	28.58
Kayastha	♀	132.90 ± 4.48	45.00 ± 3.16	33.86
Vaidya	♂	128.30 ± 4.76	39.01 ± 3.37	30.40
Vaidya	♀	132.00 ± 4.94	46.10 ± 3.49	34.92
Namasudra	♂	140.00 ± 4.43	44.50 ± 3.13	31.78
Namasudra	♀	130.40 ± 4.43	44.33 ± 3.13	33.99

TABLE 5

Bimanual difference in mean ridge-counts between fingers

	Brahmin ♂			Brahmin ♀		
Digits	Right	Left	Difference R − L	Right	Left	Difference R − L
I	18.68	17.63	+1.05	15.89	15.14	+ .75
II	13.45	12.18	+1.27	11.13	10.70	+ .43
III	13.93	13.85	+ .08	11.60	11.71	− .11
IV	16.75	16.40	+ .35	14.81	14.14	+ .67
V	14.95	15.16	− .21	12.70	12.70	0
Total	75.65	72.40	+3.25	64.30	62.05	+2.25

Table 5 (contd.)

	Kayastha ♂			Kayastha ♀		
Digits	Right	Left	Difference	Right	Left	Difference
I	17.34	16.77	+ .57	15.97	15.30	+ .67
II	12.04	12.21	− .17	12.06	11.47	+ .59
III	13.12	13.31	− .19	12.62	12.66	− .04
IV	16.21	16.96	− .75	15.89	15.24	+ .65
V	13.55	14.36	− .81	13.13	13.33	− .20
Total	69.95	71.80	−1.85	67.65	65.90	+1.75

	Vaidya ♂			Vaidya ♀		
I	17.26	15.41	+1.85	16.74	15.55	+1.19
II	12.82	10.71	+2.11	11.94	11.15	+ .79
III	12.89	12.23	+ .66	13.21	12.18	+1.03
IV	15.24	14.69	+ .55	16.31	15.15	+1.16
V	13.04	12.90	+ .34	12.80	12.99	− .19
Total	66.30	63.70	+2.60	69.15	60.45	+8.70

	Namasudra ♂			Namasudra ♀		
I	17.73	16.57	+1.16	16.84	14.82	+ .02
II	11.65	12.02	− .37	11.94	11.25	+ .69
III	12.45	13.26	− .81	12.83	12.43	+ .40
IV	16.43	16.32	+ .11	15.87	14.94	+ .93
V	14.24	14.34	+ .10	13.11	12.89	+ .22
Total	70.75	70.02	+ .73	68.60	65.10	+3.50

TABLE 6

Sex difference in ridge-counts for individual digits

Digit	Brahmin ♂	Brahmin ♀	Brahmin Difference (♂−♀)	Vaidya ♂	Vaidya ♀	Vaidya Difference (♂−♀)
Right						
I	18.68	15.89	+ 2.79	17.26	16.74	+ .52
II	13.45	11.13	+ 2.32	12.82	11.94	+ .88
III	13.93	11.60	+ 2.33	12.89	13.21	− .32
IV	16.75	14.81	+ 2.14	15.24	16.31	−1.07
V	14.95	12.70	+ 2.25	13.04	12.80	+ .24
Total	75.65	64.30	+11.35	66.30	69.15	−2.85
Left						
I	17.63	15.14	+ 2.49	15.41	15.55	− .14
II	12.18	10.70	+ 1.48	10.71	11.15	− .44
III	13.85	11.71	+ 2.14	12.23	12.18	+ .05
IV	16.40	14.14	+ 2.26	14.69	15.15	− .46
V	15.16	12.70	+ 2.46	12.90	12.99	− .09
Total	72.40	62.05	+10.35	63.70	60.45	+3.25

Right	Kayastha ♂	Kayastha ♀	Kayastha Difference (♂−♀)	Namasudra ♂	Namasudra ♀	Namasudra Difference (♂−♀)
I	17.34	15.97	+1.37	17.73	16.84	+ .89
II	12.04	12.06	− .02	11.65	11.94	− .29
III	13.12	12.62	+ .50	12.45	12.83	− .38
IV	16.21	15.89	+ .32	16.43	15.87	+ .56
V	13.55	13.13	+ .42	14.24	13.11	+1.13
Total	69.95	67.65	+2.30	70.75	68.60	+2.15

Table 6 (contd.)

Digit	$\nearrow O$	O^{+}	Difference $\nearrow (O-O)^{+}$	$\nearrow O$	O^{+}	Difference $\nearrow (O-O)^{+}$
Left						
I	16.77	15.30	+1.47	16.57	14.82	+1.75
II	12.21	11.47	+ .74	12.02	11.25	+ .77
III	13.31	12.66	+ .65	13.26	12.43	+ .83
IV	16.96	15.24	+1.72	16.32	14.94	+1.38
V	14.36	13.33	+1.03	14.34	12.89	+1.45
Total	71.80	65.90	+5.90	70.02	65.10	+4.92

TABLE 7

Values of t *for inter-group difference in the P. I.*

Groups compared					t
Brahmin	$\nearrow O$	×	Kayastha	$\nearrow O$	.13
Brahmin	$\nearrow O$	×	Vaidya	$\nearrow O$	.21
Brahmin	$\nearrow O$	×	Namasudra	$\nearrow O$	.12
Kayastha	$\nearrow O$	×	Vaidya	$\nearrow O$	.08
Kayastha	$\nearrow O$	×	Namasudra	$\nearrow O$	.01
Vaidya	$\nearrow O$	×	Namasudra	$\nearrow O$	.10
Brahmin	O^{+}	×	Kayastha	O^{+}	.10
Brahmin	O^{+}	×	Vaidya	O^{+}	.05
Brahmin	O^{+}	×	Namasudra	O^{+}	.22
Kayastha	O^{+}	×	Vaidya	O^{+}	.07
Kayastha	O^{+}	×	Namasudra	O^{+}	.01
Vaidya	O^{+}	×	Namasudra	O^{+}	.08

TABLE 8

Values of t *for sex difference in the P. I.*

Groups compared					t
Brahmin	♂	×	Brahmin	♀	.36
Kayastha	♂	×	Kayastha	♀	.10
Vaidya	♂	×	Vaidya	♀	.07
Namasudra	♂	×	Namasudra	♀	.04

TABLE 9

Values of t *for inter-group difference in ridge-counts*

Group compared					t
Brahmin	♂	×	Kayastha	♂	1.00
Brahmin	♂	×	Vaidya	♂	2.79**
Brahmin	♂	×	Namasudra	♂	1.11
Kayastha	♂	×	Vaidya	♂	2.08*
Kayastha	♂	×	Namasudra	♂	.21
Vaidya	♂	×	Namasudra	♂	1.98*
Brahmin	♀	×	Kayastha	♀	1.22
Brahmin	♀	×	Vaidya	♀	1.03
Brahmin	♀	×	Namasudra	♀	.84
Kayastha	♀	×	Vaidya	♀	.13
Kayastha	♀	×	Namasudra	♀	.40
Vaidya	♀	×	Namasudra	♀	.24

** Significant at 1 % level

* Significant at 5 % level.

TABLE 10

Values of t for sex differince in ridge-counts

Group compared					t
Brahmin	♂	×	Brahmin	♀	3.33**
Kayastha	♂	×	Kayastha	♀	1.56
Vaidya	♂	×	Vaidya	♀	.54
Namasudra	♂	×	Namasudra	♀	1.53

* Significant at 1 % level

ON THE WEIGHT OF BENGALEE CRANIA

DHARMADAS SARKAR

(*Received on 9 September 1969*)

Abstract : The purpose of the present paper is to find out whether there is any sexual and ethnic differences in cranial weight, which have long been used as a trait of anthropological importance.

Introduction

THE cranial weight is, perhaps, one of the requisite conditions that plays a vital role in the ethnic identification and sex diagnosis in particular. The weight of a crania is, however, largely dependent upon a set of interactions of some important variables, namely, age, nutrition, compactness and calcification. Therefore, the cranial weight may be looked upon as an anthropologically significant character which may be profitably utilized in any attempt of ethnic and sexual differentiation. Limited but quite extensive studies were made in this regard on varied cranial materials by Thompson (1915), Tildesley (1920), Morant (1922), Harrower (1928), Martin (1928) and others, while only a few attempts have so far been directed to expose the cranial material of Indian origin in this line of investigation by Sarasin (1892-3), Martin (1928), Harrower (1928), Banerjee (1964). It is, therefore, the purpose of this paper to report the results of study extended to some Bengalee crania.

Material and Method

The material of the present study consists of a total of 113 Bengalee crania representing two series. One of them, the Contai series, is composed of 79 crania (47 adult males, 13 adult females, 10 young adults and 9 children) which were collected

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from the district of Midnapore in West Bengal. The other series, known as Laboratory series, comprises 34 Bengalee crania (23 adult males, 11 adult females) from the district of Nadia, 24 Parganas and Jessore. One cranium No. C-24, belonging to the Contai series has been left out owing to its incompleteness. All the specimens belong to the Department of Anthropology, University of Calcutta. Each cranium was weighed by means of a pan-balance and a mean of three observations was recorded in grammes. In determining the weight of some, however, involvement of certain errors due to the missing of very soft portions, such as, lachrymal, ethmoid, tip of the nasal bone, etc. could not be avoided. Also, certain errors crept in due to the non-availability of teeth in some. The involved bias in the final determination of weight of crania (without mandible) could not be removed, but it may be said that the estimated weights approach to near-exactness.

Results and Discussion

The results are set out in Table 1 in terms of series, age and sex. It will be noted from the table that the Laboratory series, in general, is heavier, having somewhat greater variability of cranial weight, than the Contai series. It becomes also apparent that the cranial weight is maximum for males followed by a diminishing order through females, young adults and children.

As we are dealing here with a particular ethnic group, the Bengalee, constituted by two series of materials, it would be our first attempt to examine whether the two different materials exihibiting certain variations, both in the measures of central tendency and variability, are really independent estimates of a common population. For this, we have extended '*t*'-test for significance if any. The results are given in Table 2. It shows that none of the '*t*'-values is significant at the 0·05 point of probability level. Thus, there is nothing indicative to treat the material as heterogeneous, and we may, therefore, consider that the two separate series are drawn from a common

ethnic group. In this context attention may be drawn to the study made on the same Contai series by Banerjee (1964) for comparison, which is done below.

Mean Cranial weight (in gms) of Contai series

Skulls	Banerjee (1964)	Present study
Contai male	539.00 (72)	545.50 (47)
Contai female	435.70 (21)	430.90 (13)

The results obtained by us are at variance with those of Banerjee. The observed differences between the means may possibly be due to the weight recorded by Banerjee after subtracting the weight of teeth from crania and, secondly, the sampling fluctuations.

Sex dichotomy and cranial weight : Cranial weight differs in terms of sex, the male crania being decidedly heavier than the female. This fact is also borne out by the test of significance applied to our data.

It will be appreciated from Table 3, that the test arranged between male and female reveals a great magnitude of difference resulting in an extremely significant value below the 0.1% level of probability. This extreme degree of variation cannot possibly be due to mere sampling fluctuations. The weight means are found to be 549.10 gms. and 456.90 gms. for adult males and adult females respectively. Further, the variance ratio, F-test, has been applied to analyze ths sexual difference in variability. The test, F = I.10, however, demonstrates a non-significant result at the 5% level of probability. Therefore it appears that, the variabilities of cranial weight of the two sexes are not different.

Crania	n	Mean wt.	Variance	F	't'
Bengalee male	70	549.10	6827.24	1.10	4.75*
Bengalee female	24	456.90	6224.04		

*Significant at the 0.001 level of probability.

Ethnic groups and cranial weight : In Tables 4 and 5 the distributions of differential values of cranial weight of various ethnic groups are arranged in terms of diminutive order of the weight. It will be noted from the tabulations that the weight of the Bengalee crania, both male and female, are evidently lighter than the cranial weights of most of the available ethnic groups. The Bengalee crania in this respect, perhaps come closer to Burmese, Tamil, Vedda and Tibetan series, especially if we scan the data of males.

Nothing specific can further be said regarding the similarity or differences in this character between the Bengalee crania and the other groups because of the non-availability of requisite parameters of this character for others.

Summary

Data relating to the weight, of an anthropologically significant character of 114 Bengalee crania have been presented to find out the sexual and ethnic differences. The weight of the male crania (549.10 gms) significantly differs from that of the female crania (456.90 gms) ; however, test shows that they do not differ in their weight variabilities. Suitable tests could not be employed to find out the ethnic variation in cranial weight, but the data perhaps demonstrate that there might be ethnic differences of weight. The Bengalee crania are evidently lighter when compared to the data available from other ethnic groups.

Acknowledgmments :

The study was carried on in the year 1959 under the guidance of the late Dr. S. S. Sarkar, who was then Reader, Department of Anthropology, University of Calcutta and subsequently the report was prepared in the year 1966. The author further acknowledges his indebtedness to Prof. M. N. Basu, Head of the Department of Anthropology, University of Calcutta for his keen interest in the publication of this paper.

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TABLE 1

Statistical constants of weight (in gms) of Bengalee crania

Skulls	N	Weight (in gms)			
Contai series		Range	Mean ± S.E.	S.D.	C.V.
Adult Male	47	421 – 740	545.50 ± 10.07	69.00	12.64
Adult Female	13	348 – 517	430.90 ± 15.38	55.40	12.85
Young Adult	10	338 – 500	404.50 ± 14.43	45.60	11.27
Child	9	255 – 415	337.70 ± 17.40	52.20	15.45
Laboratory series					
Adult Male	23	405 – 838	558.70 ± 20.73	99.32	17.78
Adult Female	11	350 – 648	485.86 ± 24.04	79.60	16.38
Total Adult :					
Male	70	405 – 838	549.10 ± 9.72	82.63	—
Total Adult :					
Female	24	348 – 648	456.90 ± 15.75	78.89	—

TABLE 2

Values of t*-test in mean weight of the skulls of Contai and Laboratory Series*

Skulls	Mean weight (gms) ± S.E.	D.F.	Values of '*t*'
Adult Male :			
Contai series (47) and Laboratory series (23)	545.50 ± 10.07 and 558.70 ± 20.73	68	0.57
Adult Female :—			
Contai series (13) and Laboratory series (11)	430.90 ± 15.38 and 485.86 ± 24.04	22	1.93

TABLE 3

Values of T*-test in mean weight between the two sexes of Contai and Laboratory Series*

Skulls	Mean weight (gms)	D.F.	Values of '*t*'	Remarks
Contai series :—				
Adult Male (47)	545.50	58	5.23	Significant
Adult Female (13)	430.90			
Laboratory series :—				
Adult Male (23)	558.70	32	1.97	Significant
Adult Female (11)	485.86			
Contai and Laboratory combined :—				
Adult Male (70)	549.10	92	4.75	Significant
Adult Female (24)	456.90			

TABLE 4

Mean weight in gms of the adult male skulls from different population groups (arranged in order of weight)

Population	N.	Mean weight (in gms)	Authors
Fuegians	—	872.2	Sergi and Martin (1915)
Faroe Islander	—	870.0	Martin (1928)
New Caledonia	—	816.0	,,
Australian	—	777.0	,,
Moriori	33 – 35	764.3	E. Y. Thompson (1915)
German	—	755,0	Martin (1928)
Pole	—	740.0	,,
Ainu	—	740.0	,,
Malayan	—	735.0	,,
German	—	731.0	,,
Russian	—	729.0	,,
Tamil	—	711.0	,,
Hungarian	—	704.0	,,
French	—	703.0	,,
Japaneese	—	700.0	,,
Mexican	—	676.0	,,
Tibetan 'B'	15	673.1	Harrower and Morant (1928)
Burmese 'A'	38	658.8	Harrower (1928)
Ceylonese	—	657.0	Sarasin (1892-93)
Burmese 'A'	38	656.8	Tildesly and Morant (1920-2)
Hokien	36	656.0	Harrower (1928)
Egyptian	—	623.6	Davin (1915)
Oceania	100	622.1	Von Bonin (1936)
Hylam Chinese	39	621.7	Harrower (1928)
Rumanian	—	621.0	Martin (1928)
Burmese 'B'	7	595.6	Tildesly and Morant (1920-2)
Burmese 'C'	6	578.0	,, ,, (1920-2)
Tamil	35	575.0	Harrower (1928)
Vedda	—	574.0	Sarasin (1892-3)
Bengalee	*70*	*549.10*	*Present study*
Bengalee	72	539.0	Banerjee, P. (1964)
Tibetan 'A'	17	525.4	Harrower (1928)
Tibetan 'A'	17	524.5	Morant (1922)
Senoy	—	509.0	Martin (1928)
Onge	2	508.0	Gupta *et al.* (1960)

TABLE 5

Mean weight in gms of the adult female skulls from different population groups (arranged in order of weight)

Population	N.	Mean weight (in gms)	Authors
Faroe Islander	—	723.0	Martin (1928)
Fuegians	—	722.5	Sergi and Martin (1915)
Malayan	—	688.0	Martin (1928)
Pole	—	669.0	,,
New Caledonia	—	651.0	,,
Australian	—	638.0	,,
Moriori	20—23	622.2	E. Y. Thompson (1915)
Japanese	—	619.0	Martin (1928)
Rumanian	—	606.0	,,
Ainu	—	606.0	,,
German	—	595.0	,,
Hungarian	—	570.0	Martin (1928)
Tamil	—	566.0	Sarasin (1892-3)
Ceylonese	—	563.0	,,
German	—	555.0	Martin (1928)
Burmese 'A'	31	530 6	Tildesly (1920)
Vedda	—	521.0	Sarasin (1892-3)
Burmese 'B'	13	501.5	Tildesly (1920)
Oceania	44	499.8	Von Bonin (1936)
Egyptian	—	482.4	Davin (1915)
Bengalee	*24*	*456.90*	*Present Study*
Senoi	—	440.0	Martin (1928)
Bengalee	21	435.70	Banerjee, P. (1964)
Onge	1	428.0	Gupta *et al.* (1960)
Burmese 'C'	11	425.2	Tildesly (1920)
Pygmies	9	395.0	Smith (1911)

SOME PHYSICAL STUDIES AMONG THE GUJARS OF DELHI

PRASANTA KUMAR CHATTOPADHYAY

(*Received on 9 December 1968*)

THE Gujars are an important population of Northern and North-Western India. They are primarily cattle-breeder and pastoral people. They also practise settled agriculture.

The Gujars studied in the present paper are Hindus. They are endogamous, and practise *gotra* exogamy. The *gotra* exogamy among the Gujars is like that of the Jats and the Ahirs (Chattopadhyay 1968a). They come mainly from the villages of Fatehpur Beri, Asola, Chandanola, Jaunopur and Ghittorni. These are South Delhi villages situated near the Delhi-Gurgaon (a district in Haryana) border. Majority of the subjects belong to Basatta, Lohmur and Tomar *gotras*.

The present paper deals with the different types of hand clasping, arm folding, handedness, comptodactyly and ear-lobe types among the Gujars. The frequency of colour blindness among them has been reported elsewhere (Chattopadhyay 1968d). Details about their dermatoglyphic (finger, palm, sole, and toe prints), and other genetical and morphological characteristics will be reported in future publications.

Material and Method

Hand clasping, arm folding, handedness, camptodactyly and ear-lobe types were observed on 217 Gujar males. Their ages ranged from 8 to 58 years. The method followed has already been described elsewhere (Chattopadhyay 1968a, b, c and 1969).

Results and Discussion

The frequency of different types of hand clasping, arm folding, handedness, camptodactyly and ear-lobe types are

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given below. It will be observed from the tables that the frequency of R-type of hand claspers, and persons with attached ear lobe is 57.14 and 26.27 per cent respectively.

The Gujars are found to resemble the Jats in hand-clasping, arm folding, and ear-lobe types, and the Ahirs, for the ear-lobe types. (Chattopadhyay 1968a, 1969) as is evident from Table 2. The frequency of L-type of arm folders among the Gujars is 61.75 per cent which is similar to most of the populations reported so far.

Data for the frequency of the different types of handedness and camptodactyly among North Indian populations, as far as I am aware, are not available as yet. As such not much can be said about them. It is, however, evident from Table 1 that the frequency of left-handed persons and those affected with camptodactyly is very low (only 0.92 and 1.94 per cent respectively). Chattopadhyay (1968c) also found the frequency of left-handed persons and those affected with comptodactyly to to be rare among Bengalees.

Summary

217 Hindu Gujar males from Delhi have been studied for different types of hand clasping, arm folding, handedness, camptodactyly and ear-lobe types.

1. The frequency of R-type of hand-clasping persons is found to be 57.14 per cent among the Gujars which is similar to the frequency obtained for the Jats, a neighbouring population. The frequency is well within the range of the Caucasoids.

2. The frequency of L-type of arm folders is 61.75 per cent among the Gujars.

3. The frequency of left-handed persons and persons having camptodactyly is found to be 0.92 and 1.84 per cent respectively among the Gujars.

4. 29.27 per cent of the Gujars studied have been found to have attached ear lobe, which is within the range of the Caucasoids (16.0 to 40.5 per cent).

Acknowledgment

I take this opportunity of expressing my deep gratitude to Dr. A. K. Mitra, of the Dept. of Anthropology, University of Delhi, for his encouragement and valuable suggestions in the field. My grateful thanks are due to Mr. Sarin, Educational Officer, Municipal Corporation, Delhi (South Zone), Mr. Mam Chand, Councillor, Municipal Corporation, Delhi from Fatehpur Beri, the staff and student of Ghittorni Hr. Sec. School, Delhi, M. C. Middle School for Boys, Fatehpur Beri and Sarai Kale Khan, Delhi for their excellent co-operation during the collection of the data.

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TABLE 1

Frequency of hand clasping, arm folding, handedness, camptodactyly and ear-lobe types among Gujars.

	No.	Percentage
Hand clasping :		
R-type	124	57.14
L-type	93	42.86
Total	217	100.00
Arm folding :		
R-type	83	38.25
L-type	134	61.75
Total	217	100.00
Handedness :		
R-type	215	99.08
L-type	2	0.92
Total	217	100.00
Camptodactyly :		
Normal	213	1.84
Affected	4	98.16
Total	217	100.00
Ear lobe :		
Attached	57	26.27
Free	160	73.73
Total	217	100.00

TABLE 2

Comparison of Gujars with Jats and Ahirs.

	Gujars	Jats	Ahirs
Hand clasping :			
R-type	57.14	53.19	—
L-type	42.86	46.81	—
Arm folding :			
R-type	38.25	39.71	—
L-type	61.75	60.29	—
Ear lobe :			
F-type	73.73	76.63	68.75
A-type	26.27	18.70	31.25
Absent	—	4.67	—

CHANGING A COMMUNITY'S CULTURE

N. PATNAIK

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Abstract. In the present paper the author describes his experience of the Lamba Lanjia Saoras of Orissa. He describes how beliefs and empirical knowledge are intimately intertwined in their culture and how their economic life is sustained thereby. His contention is that if a change is designed for the Saoras, one has to bring about changes in regard to both technology as well as belief.

THIS paper examines the major economic pursuit, that is, the shifting cultivation practised by the Lamba Lanjia Saoras, one of the most primitive tribes of Orissa and tries to find out whether or not the domain of reason and rational behaviour and that of mysticism and ritualism exist side by side ; and if they do, whether one domain can be disentangled from another. This paper stresses another point which is concerned with the utility of such knowledge. Anthropologists assert that a thorough knowledge about the social and cultural life of a community is an essential prerequisite for its development, and ignorance of it impedes development and ultimately does more harm than good to the community,

Before proceeding with the analysis, a thumb-nail sketch of the Saora tribe needs to be given. The Saoras constitute a major tribe in the State of Orissa. In Ganjam district alone they number 97,128 and most of them live in the Parlakhimedi Agency. Lamba Lanjia Saoras, who are the main concern of this paper, are one of the important sections of the Saora community, there being six other sections differentiated

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from one another on the basis of occupation. Lamba Lanjia Saoras inhabit mainly the Parlakhimedi Agency which is may one of the most inaccessible parts of Orissa.

The Saoras are forest dwellers. Generally they select a site at the foot of a hill with prospects of hoe cultivation. They also try to determine whether enough land is available and whether water is also available near by. These two things are the main criteria in selecting a site for a village. The village is usually formed by a linear cluster of huts, even though there be a few houses outside the main cluster.

The economic life of the Saora hinges mostly on shifting cultivation ; although in a few cases wet cultivation is practised. Hunting and gatheriug are pursued more as a pastime than as a source of subsistence. There are two types of shifting cultivation practised by the Saoras : (1) *Bada*— shifting cultivation on terraced lands lying very close to their villages, and (2) *Bagada*—shifting cultivation on hill slopes.

As the analysis presented in the paper centres round the Bagada form of cultivation, a short account of it may be given here. All activities connected with shifting cultivation are performed by communal labour. The first step is to decide which hill-side is to be chosen for this purpose. This is done in a common village meeting attended by all the adult male members. At a later date, the villagers gather near the area chosen and parcel out the plots on the hill-slope among themselves. This is how actually it is done. The hill slope is divided into several plots running from its top to bottom. The plots are demarcated by the existing trees or stones on the demarcation line. They are then distributed among the villagers according to their need. A man having a larger family and more man-power is given a bigger plot, or more than one plot, while one having a small family with limited labour is given a smaller or a even a single plot.

A hill-slope is cultivated consecutively for 3 years after which it is left fallow for recuperation. In the meantime, a nearby hill-slope is similarly divided into several plots, demarcated and distributed for cultivation. Ordinarily two hill-slopes are cultivated alternatively in an interval of 3 years.

In subsequent allotments of the plots, previous ownership is taken into consideration. The man who has been cultivating a particular plot of land continues to 'own' it as long as he is capable of cultivating it. When he fails to do so, the plot is allotted to someone else who has need for it. In no case are the plots left fallow, nor is a plot already owned by one capable of cultivating it, allotted to anyone else. Thus individual ownership of the plots of land on the hill-slope is recognized on a hereditary basis. But when any plot lies fallow it reverts to communal ownership.

The major operation of shifting cultivation begins with cutting down trees on each of the plots and clearing the shrub and burning it. This work is done by communal labour (*ansir*) recruited from the village and from their relatives-affinal or consanguineal. Food and drink is supplied at midday to the labouring team. Thus, by turn, everybody's plot is cleared by means of communal labour. Practically all agricultural operation, such as, ploughing, sowing, harvesting etc., are carried out by the voluntary labour team, turn by turn, for all the families of the village in a cyclic order.

Cereals, pulses, beans and millets are extensively grown. Paddy is not cultivated. A mixture of the seeds of these crops is sown and harvesting is done one after another. The Saoras are fond of eating gruel cooked from mixture of *kangu* (*Panicum*), *gangai* (a kind of millet), *kandula* (*Dolichos catjang*) etc. They also add to the gruel some leaves which taste sour, and take it when hot and fresh. They also grow these leaves in the fields.

All agricultural activities are accompained by ritual performances. Before any clearance is made, the religious head Buiya is called for offering a pig or fowl to the Earth God, Labosum, and the gods of the hills in the month of June, the Saoras know that the time for sowing is very near. The Saoras sow their seeds just before the rains. Sowing is done by the help of a hoe. First a hole is máde with the hoe and a few seeds are put in it and the earth round it is levelled. When the plants are about a cubit in height, the Saoras make some sacrifice to the goddess of agriculture, Gungi Devata, for a full

harvest. When the plants grow taller and the grains start ripening, then comes the heavy task of guarding them from birds, monkeys and other wild animals. When the crops are fully ripe they are harvested one after another, and lastly a ritual is performed when offerings are made to the ancestors for their kindness and blessings of a happy year.

With the most rudimentary implements, such as a hoe and a small axe, they are able to raise crops sufficient to maintain their family. Their success in agriculture depends, besides the fertility of the soil, upon their extensive knowledge of the crops suitable for cultivation on the hill-slopes, upon the geographic conditions of the locality, and last, but not least, upon the knowledge of the importance of accurate and hard work organized with a team spirit. They have to clear the scrub and burn it into ashes. The operation of clearing is finished shortly before the beginning of rains; so that when it rains the ashes get mixed up with soil and thus add fertility to it. Similarly, they have fixed timings for hoeing the field, planting the crops and weeding them. In all these they are guided by a clear knowledge of weather and season, plants and pests, soil and resources. The environmental conditions, resources and the agricultural operations are fitted in a routine conforming to one another. They have a strong conviction that this knowledge is true and reliable and by counting upon this knowledge and observing it most scrupulously a good crop is harvested.

Yet, mixed with all these activities based on their knowledge, there are a number of rituals performed in a rigorous sequence and order with unabated devotion. Such ritual observances are regarded as absolutely indispensable, as much as the agricultural activities are, for a good crop. They believe that if they perform only the ritual ceremonies and do the work in the perfunctory manner, their crops would suffer and would not yield properly. They say that if they do not watch their fields when the crops are maturing the forest animals and birds would eat them up. Their experience shows that if they do not properly clear the slope they get a very poor yield. In such cases they do not resort to rituals but to hard

work, guided by knowledge and reason. Their experience has made them also to think that in spite of their efforts and forethought, in some years, they get bad results and this is attributed to ill luck, to invisible forces and agencies which thwart all their strenuous efforts and the best of knowledge and reason. To control these invisible forces they take recourse to the propitiation of deities and the performance of rituals.

Shifting cultivation is considered to be very harmful because it causes deforestation and soil erosion. For these reasons many people advocate a complete ban upon this method of cultivation. To those who decry shifting cultivation, the Saoras like other tribals who practise such cultivation appear to be men without reason. In their opinion, they are the most illogical persons guided by an outlook of conservatism and superstition. The study based on an informally guided interview with a group of Saoras of Parlakhimedi Taluk is most revealing in this regard. A portion of the interview covering conversation between the present author and the Saoras on this subject of slash-and-burn type of cultivation is presented below, and at the end of it an analysis of this conversation will be made. The interview is as follows :

Interviewer : What are the immediate needs which you want to satisfy ?

Respondent : Water for the paddy-fields. There is scarcity of water here. We also want that the well dug by the Government should be made *pucca*. The parapet and the platform of the well should be completed. Moreover, we want land to cultivate and also bullocks.

In : If you are given land and bullocks will you give up shifting cultivation ?

Re : Certainly not, we will not give it up. We will carry it on and at the same time take up low-land cultivation.

In : The low land will take all your time. How will you find time to attend to the other ?

Re : We will work on low land and our women will work on *bagada*.

In : Women are also needed in wet-cultivation. So how can you do both of them ?

Re : We grow various crops on *bagada-kangu*, *jana*, *gantia*, *kandula*, *jhudanga*, *rasi* and turmeric. We have also *Salapa* palms and mango and other trees on the mountain slopes. These will not ripe in the low land. We will lose them if we give up *bagada*. On the whole, we will be losers.

In : If you are all given land to cultivate, sufficient for every family and by intensive cultivation can grow more, what difficulties will you have by giving up *bagada* ?

Re : If rain fails, we would get no crop in the low land. But a small shower of rain or in case of lack of it the dew drops provide sufficient moisture to the seeds to sprout and ripen the crop.

In : I want to take some of you to my native place and show you how farmers are prosperous there. You will similarly be rich if you adopt new methods of agriculture.

Re : (The older people particularly replied) No, we do not want to go anywhere. Nor do we want to give up *bagada*. We should not give up. We ripen every thing in our *bagada* fields.

In : By education and by seeing the great world outside one can learn many things and can improve his economic candition. What do you think about it ?

Re : It will happen if we have good luck. All the the seeds we sow do not ripen even to the extent of a *puti* (a measure which contains 5½ seers).

In : If you use improved seeds and apply manure you may then be able to grow more.

Re : (Could not understand what is improved seed and manure).

In : Do you think that your deities will be angry if you would give up *bagada ?*

Re : (They smiled on my simplicity and replied) No, they will not get angry. (However this is their covert response-In.)

In : Do you think that your wives will object to your giving up *bagada ?*

Re : (Being vexed, they emphatically replied) We say, we shall on no account give up *bagada.*

Bagada for the Saoras is not only a means to livelihood, it is also a way of life. It is interwoven intimately with their lives. They have been practising it for many generations. The cohesion of the group is maintained through this economic base, and one can easily perceive its moral and social influence. Community labour, by means of which all the agricultural operations in the fields are performed, makes not only the *bagada* successful, but also keeps in tact their social system.

There is no denying the fact that the cereals, pulses and millets which they grow on the hill-slopes are not suitable for wet cultivation. The problem of changing from shifting to settled cultivation is intertwined with the problem of changing their food-habits also.

The Saoras are in the habit of eating gruel which is prepared from *kangu, gangai,* etc., all mixed together. They add to the gruel also some leaves of sour taste. They do not ordinarily take rice ; and whenever they get rice from some source they mix it with the cereals and prepare gruel which is their common diet. They do not take anything cold, because they believe that any food taken cold causes cold. Food habits are very difficult to change. Perhaps it is on this ground that they fear to lose their grip on the old and established pattern of living.

This brings us to the conclusion that the Saoras like all other tribal communities are not entirely guided by ritualism and superstition. Nor are they wholly 'pre-logical' and 'irrational'. Within the traditional world of their culture, there is both the conservative mind deeply interested in ceremonialism in order to keep themselves in touch with the supernatural reality, which helps them to maintain the traditional ethical system. There is also to be found the empirical and rational knowledge about land, soil, wind, animals etc. based on keen observation and experience. Both the domains, though structurally and functionally distinguishable, are integrated parts of their culture. It is the thorough recognition of both beliefs and experience which makes their life meaningful and which appears to be fundamental in order to prepare programmes designed for their economic and cultural development.

BOOK REVIEWS

The Stone-tipped Arrow/Late Stone-Age Hunters of the Tropical Old World. *By Bridget Allchin, Phoenix House, 10-13 Bedford Street, Strand, London W. C. 2, 1966. Pp. xii + 224 + Frontispiece, 16 pages of plates, 43 line drawings and 4 maps. 84 shillings net.*

In eight chapters, the author presents a summary of the available archaeological evidence relating to the Middle and Late Stone Ages in South and Equatorial Africa, Northern and Southern India, Equatorial Islands like Ceylon or the Andamans, and, lastly, Australia. In the eighth chapter, she draws a number of general conclusions ; while in the two appendices following these chapters, there is offered a systematic classification of stone tools, and a classified list of tools from a number of sites mentioned in the text.

The archæological evidences marshalled from different geographical areas are naturally of an uneven quality. The stratigraphical analysis of some authors are sometimes satisfactory. and sometimes poor. The author, however, arranges whatever stratigraphical evidence is available in a series, and also tries to arrange tools, discovered outside a stratigraphical context, in the same series by a reliance upon their typological characteristics.

It is not very unreasonable to expect that tools can be arranged in roughly one typological or evolutionary series of which parts may be ascribed to the Middle and part to the Late Stone Age. But one may question the reliability of such a series in the reconstruction of *cultural* evolution. Although the *origin* of particular types may be assigned to the ages in question, it is doubtful, how far the actual finds belong *chronologically* to the particular ages, ascribed to them in the absence of rigid stratigraphic evidence. As the author herself admits, the homotaxial relationship of a particular series in, say, Africa and India may be one, while the actual chronological relationship may be another.

For purposes of reconstruction, the author has depended very much upon the method once made familiar by Sollas in his *Ancient Hunters*. There is some amount of ethnographic description available about hunting-and-gathering communities like the

Bushman, Chenchu, Veddah, Sakai, Semang and the Australian aborigines. The author draws freely upon these sources, and tries to build up the life of the makers of what she considers, largely on the basis of typological characteristics, to belong to the Stone Ages in question. In the case of some of the Indian and and Ceylonese present-day hunters and gatherers, she does say that their old ways of life have been disturbed by the presence of more advanced neighbours ; but she chooses some elements of the culture of these tribes and holds that *these* can be looked upon as survivals from the Stone-Age past. But this last assumption or premise has not been questioned by her in a sufficiently critical way.

According to the present reviewer, the author depends too much upon the theory of the persistence of old ways of life, i.e. on their 'survival' than is fully justified. Hunting and collecting among the Birhor of Bihar (not referred to in the text), may, for instance, be the outcome of a comparatively recent, specialized adaption of a jungle-living community to the presence of an impinging peasant community rather than a 'survival'. This possible source of error has been overlooked by the author in her reconstructions.

Perhaps very much harm is not done if one keeps in mind the degree of reliability of the evidences which the author has used for purposes of reconstruction of the life of hunters and gatherers in the Stone Ages in question

One of her major findings is that, even in the world of these 'Tropical' communities, there was a large amount of regional differentiation. And this according to her, was due to differences in the geographical conditions under which each community lived and worked. In her ecological differentiation of cultures in India, the author has relied upon the work of F. J. Richards to some extent. It appears that she is unaware of the study of regional differentiation of culture as revealed by the work of the Anthropological Survey of India, although these belong to later times, and belong largely to peasant communities. (*Peasant Life in India*, Memoir No. 8, 1961 and *Pottery techniques in Peasant India*, Memoir No. 13, 1964.) Such differentiations have been due more to historical and less to geographical or ecological reasons.

They throw some light on the nature of geographical determinants which is different from that of Richards, for instance.

On the whole, the book brings together a substantial amount of information, and shows evidence of a keen, synthetic imagination and of a commendable endeavour to bring order out of a mass of archaeological data, even when these are of uneven quality.

N. K. Bose

Women in Indian Folk-lore : *A short survey of their social status and position. Foreword by Sm. Indira Gandhi, edited by Sankar Sen Gupta. Indian Publication, 5 British Indian Street, Calcutta-1. Pp. LXII 327. Rs. 45.00.*

Women in India Folk-lore, consisting of an introduction and twenty-six essays by different authors, or rather, claims to be, a short survey of the social status and position of the Indian women through the ages, as depicted in our folk-lore. Nearly all the authors have clssified women according to the various roles played by them in society. The joys and sorrows, hopes and fears, tears and blushes, in short, the ultimate fate and status of women of different provinces and times have been described by means of sayings and proverbs.

It is, however, difficult to understand the Editor's choice of the title. Folk-lore, as we know, is an extremely comprehensive term, including not merely proverbs but also the numerous tales and legends, ballads and fairy-lore, rhymes and sayings that have come down from generations and which form such a distinct part of a country's culture. But unfortunately nearly all the essays deal with proverbs alone and thus virtually ignore the real bulk of folk-lore. It is merely a collection of essays about Indian women in general, with a few sayings thrown in. Even the voluminous introduction by the Editor is a general essay on India and barely touches upon the subject meant to be introduced.

Some authors have not taken the trouble of translating the rhymes and proverbs quoted ; so that it is impossible for those not knowing the language to understand what they mean. A good many of those translated are so vague and ungrammatical that their implications can merely be guessed at.

The Editor does not seem to have exercised any discrimination in choosing the essays. Some of these could easily have been

omitted, as they merely repeat the same theme and in the same pattern. He also appears supremely indifferent to the unbelievable abundance of grammatical error which renders innumerable remarks quite unintelligible. The correction of these might not have enhanced the basic value of the volume, but should have been attended to, nevertheless, for the sake of the readers.

Swapna Dutta

Jobs for Our Millions. *By V. V. Giri. Vyasa Publications, 12 Thambuchetty Street, Madras-1. 1970. Pp. 116.*

One of the most important elements of Gandhiji's method of bringing about change was his Constructive Programme. Satyagraha was devised by him as a means of collective direct action of the non-violent kind ; but its preparation could only be made by extensive engagement in the task of building up democracy from the grass-roots through the establishment of new institutions in place of the old. Unlike many other political thinkers, Gandhiji held the view that it was not enough to capture political power, it was more necessary to educate and organize the peasantry and artisans who would be encouraged to lay the foundation of new institutions based upon equaiity and justice, even under the constraints set by the circumstances under which they found themselves.

In contrast to Gandhiji's teaching we have, however, during the last twenty-two years placed more reliance upon action from the top rather than from the base. But we have perhaps done so at our peril. In spite of all the achievements made, which have undoubtedly not been negligible, it has been discovered that there is more inequality today than before. The benefits of development have reached some classes, but not particularly those whose interests were Gandhiji's prime concern.

It is very refreshing therefore that a re-examination of the task which lies before us has now begun at the highest levels of our land. President V. V. Giri was indeed the Convener of the National Planning Committee in 1938 when it was formed by Subhas Chandra Bose as President of the Indian National Congress. Later on, as Minister in the Government, Shri Giri tried to introduce measures of a constructive nature in Madras, while his experience as a leader of labour organization has also been long and intimate.

In the present book, the President comes forward with a practical suggestion regarding constructive work as it can be done today. He sets out a programme not only for finding jobs for our millions, but also for activizing the middle-classes so that they can utilize their talents for national reconstruction.

Today in India we have 6,500 Community Development Blocks in the 324 districts into which the country is divided. The suggestion is that in each of these Blocks there should be established multipurpose co-operative farms, peopled by one hundred families each, which will harness the talents of not only the farmer, but also of the engineer, teacher, medical man, and bind all of them together in a common task. If it is not posible to cover the whole of India in the first round, one should begin with those communities which have so long remained in the backwaters of national development, namely, the so-called Backward Classes.

The suggestion is practical, and suited to the present-day conditions of India. We do hope it will attract the attention of all those who want to share in the task of building up a new and prosperous economic system in our country.

N. K. Bose

Dynamics of Leadership. *By B. N. Sahay, Bookhive, 26/18, East Patel Nagar, New Delhi-8. 1969. Pp. vii + 227. Rs. 20.00.*

In view of the various welfare and development programmes, it is particularly interesting to know what is happening with the leadership structure of the people of India. Dr. B. N. Sahay's book *Dynamics of Leadership*, is an attempt to understand this particular facet of the problem of leadership. For many reasons Dr. Sahay's study would be helpful to administrators, planners as well as politicians.

Dr. Sahay has organized his study into seven chapters. In the first chapter he introduces his topic elaborating the theories, importance, objectives and hypothesis of the study. He also describes the basis of his selection of villages and the two ethnic groups of people investigated. The seeond chapter gives the detailed geographical, ethnographic and historical background of

the people of these villages. The findings really begin with chapter 3. Dr. Sahay has rightly classified the leadership pattern into three categories, e.g., Traditional (chapter 3), Traditional-emergent (chapter 4), and Emergent (chapter 5). Chapter six deals with 'Leadership in Democratic Institutions', in relation to Panchayat and then finally in chapter 7, the findings are critically summarized and discussed.

The data given in the appendices of this book are of great value and would provide guide-lines for designing welfare programmes in future.

T. K. Moulik

Encyclopaedia of Social Work in India. *Foreword by Dr. S. Radhakrishnan. Published by the Publication Division, New Delhi on bahalf on the Planning Commission, Government of India. (Vol. I) Pp. xxxi +527, (Vol. II) xi + 688, (Vol. III) xii + 297. Price Rs. 60.00 per set of three volumes.*

The Planning Commission, Government of India has been responsible for the compilation of an Encyclopaedia of Social Work in three volumes. The general arrangement is that after certain preliminary notes and introductions, there is a series of articles on various topics arranged alphabetically. Each of these topics has a wide coverage and has been contributed by experts in the field. I may name some of these topics in order to illustrate the wide spectrum covered : adoption, beggar problem, community development—rural and urban, economics of social welfare, family, history of social reformers from 1847, internal assistance, leadership, population and population problems, scheduled castes and their welfare, scheduled tribes and their welfare, sarvodaya, social research, social welfare activities by religious groups—Christians, Muslims, Parsis, Sikhs, tuberculosis, youth hostels and welfare.

These constitute Part I of the Encyclopaedia which is contained in the first and a large part of the second volume. Part II consists of biographies of social reformers, social workers, social philanthropists, leaders of social movements. The biographical portion covers 20 pages and is followed by Part III which consists

of social statistics. The third volume of the book is formed of Part IV, V VI and VII and these are devoted respectively to a directory of agencies, classified lists of backward communities, various Central and State Acts relating to social welfare, employment exchanges, municipal corporations. The appendices form Part VI of the Encyclopaedia and they contain extracts from the Constitution of India, U. N. Charter,—Universal Declaration of Human Rights. Part VII gives us the biographies of the contributors.

As one goes through this exhaustive Encyclopaedia one is impressed by the amount of labour and judgement which has gone into its preparation. Practically all aspects of social work have been covered while a very large amount of information has also been given which will be of assistance to social welfare organizations, whether governmental or non-governmental as well as to members of the public who may be interested in questions of social welfare and change.

On, perusal of the biographies of social workers, reformers and of others a compressed within 20 pages, it appears to the reviewer that this section at least was done under a condition of haste. The entries under each of the heads are not often what one would expect in a very authoritative volume. These are of a sketchy character, probably compiled from readily available material and put together comparatively within a very short time. One would have liked very much that the dates when many of the organizations founded by social workers like Gokhale or Gandhiji were also given when they are named in their brief biographies. In such biographies, again, it is not necessary that appreciations should also be registered. For Instance, when Dr. Ambedkar is referred to as 'a modern Manu' or 'a doughty valiant and relentless champion of the depressed classes', these are qualifying phrases which seem to be rather out of place. It has evidently been on account of the hurry of printing that a few mistakes have also appeared here and there. For example, the date of the death of Swami Vivekananda at page 471 of Volume II has been given as 1911 whereas, as far as is known, his death took piace in 1902.

Anyway, these are very minor imperfections and we are sure that while reprinting the Encyclopaedia such slight mistakes will will be removed.

The Encyclopaedia is very reasonably priced and we hope it will become very popular. The editor and the large number of expert writers who have contributed the certicles deserve our warmest congratulations for the excellent work which they have done.

N K. Bose

Prolegomena to Lamaist Polity *by Nirmal Chandra Sinha Foreword by Hugh Richardson (Calcutta : Firma K. L. Mukhopadhyay 1969) Pages 90 + XI, Rs. 20.*

The author uses a humble title "Prolegomena", that is, preliminary observations but he makes an exhaustive study of the Lamaist Polity. That the study is extensive is apparent from the Notes alone, which cover 48 pages out of the total 90 pages.

The book deals with three topics :—

(i) The Refuge : India, Tibet and Mongolia.

(ii) The Helper, Protector Dalai Lama, the reincarnation of Bodhisattva Avalokiteśvara Potalaka.

(iii) The religious government, both spiritual and temporal.

In the first chapter the author points out that the formula of Triśaraṇa refers to the three Ratnas : Buddha Dharma and Saṅgha but as a matter of fact, he points out that, the first two are conceptual, transcendental and intangible, while the third (Saṅgha) is actually seen in the world of beings and hence taking refuge in the Saṅgha is more efficacious than that in the other two Ratnas, because Saṅgha is the helper and guide in the practice of dharma. In the Dakṣiṇa-vibhaṅga-sūtra (Majjhima Nikaya, III, p. 253) appears the following lines : "Bhagava Mahapajapatim etad avoca :

saṅghe, Gotamī, dehi, saṅghe to dinne ahan ceva pūjito bhavissami saṅghe cati" (Bhagavan told Mahapajapati Gotami to offer her gifts to the Saṅgha as thereby he will be adored as well as the Saṅgha). The author also points out that the monks of Kar-gyu and Sakya sects propagated Triśaraṇa among the Mongols, Kalmuks and Buriats.

The author incidentally mentions that Triśaraṇa implies śraddha (firm faith and devotion) in the three Ratnas and that it should be distinguished from the Vaiṣṇava concept of Bhakti (also devotion) as it has in view a personal relation between the devotee and the Supreme God, the existence of which is denied in Buddhism.

In the second chapter the author deals with the Helper or Protector of worldly beings. In Mahayana Buddhism this helper is Bodhisattva Avalokiteśvara of Potalaka. A Bodhisattva is defined in Śantideva's Bodhicaryavatara as one who develops Bodhicitta, that is, one who takes the vow of sacrificing one's own self for rendering service to others. Dalai Lama happens to be the reincarnation of this Bodhisattva and so he is expected to render service to others. By way of comparison the author refers to the *guru* system of Upaniṣads and other non-Buddhist treatises (vide p. 30). Buddha was also known as śasta, *guru* (teacher).

The Prajnaparamita is the basic and earliest work of Mahayana Buddhism, origin of which took place in the second century B. C. while Tantricism appeared about the seventh century A. D. Rin-po-che Padmasambhava was the earliest leader and exponent of Tantric Budhism. The author has given also names of many other Tantric teachers along with their chronology. He states the fact that the Sakya and Kargyu Lamas saved Tibet from the atrocities of the Mongols.

Chapter III is devoted to the spiritual and temporal government of Tibet. The author rightly states (p. 59) that in Buddhism "the anti-thesis between politics and ethics was all through involved with a quest for temporal authority sublimated into righteous rule." In Tibet monks had the same right as layman to be appointed as civil

and military officers. The monks of Sakya and Kargyu sects actively participated in the politics of Tibet as well as Mongolia, sharing powers with the secular nobles.

From the brief survey of the contents of the book, as given above, it will be apparent how valuable is this book, which deserves attention of scholars interested in the history of Tibet and Lamaist Polity.

Nalinakshya Dutta

L'Invocation : Le Haripath de Dnyandev. *Paris : Ecole francaise d'Extreme-Orient—1969—Pp. 170.*

Charlotte Vaudeville, by her long years of residence in India and her close study of things Indian, was well-equipped to write this volume on the Haripath of Dnyandev. She is evidently in love with the poet-saints of Maharashtra : and her meticulous scholarship appears on every page of this book. The original Haripath seems to date from the year 1290. In its present form it is a sequence of 27 strophes in old Marathi ; its theme is the praise of the names of Vishnu-Hari. There subsists a doubt as to the exact identity of Dnyandev.

C. V. describes in detail the literary genre to which the Haripath belongs as well as its structure. This devotional and lyrical composition being meant to be recited or sung, its structure is a matter of great interests. Its inspiration is a mixture of advaita monism and bhakti kirtana, resulting possibly, as the author suggests, from the fact that the text has undergone manipulations during the long period of its oral transmission, till it came to be put into writing. It is a fervent hymn to the pure love of the divine names, and deprecates empty devotional practices.

After 78 pages of introductory study and an abundant bibliography, we are given the original text with critical notes, and a French translation, also copiously annotated. The volume concludes with two supplementary indexes. We are thankful to Charlotte Vaudeville for introducing us to this fine specimen of ancient Indian devotional lore.

F. E.

Bulletin de l'Ecole francaise d'Extreme-Orient—*Tome LVI Paris : 1969.*

For centuries Buddhism has been a pervasive influence in most countries of the Far East. We shall not be surprised therefore to find that this yearly bulletin gives much attention to Buddhist questions. Among the various articles I note one on some modern Buddhist hermitages in Cambodia, in which the mode of life of the monks differs considerably from that of ancient times. In general, the modern monks give less time to solitary meditation and more attention to the spiritual needs of the lay folk, not a few of whom, both men and women, flock to those hermitages for a longer or shorter period of time, to follow in a more or less strict manner the way of life of the monks. The way of life and occupations in these monasteries are not uniform since each has its own independent existence within a general monastic tradition.

Another articles is about a particular monastery, that of Tep Pranam at Oudong (Cambodia). The study of the origin, actual composition and structure, and the activities of the monastery were undertaken as a research project by a group of university students under the direction of some professors. It is an interesting example of co-operative research and field work. As usual, the volume carries a number of apposite illustrations.

F. E.

Le Bornage ritual des temples Buddhiques au Cambodge par Madeleine Giteau. *Paris : Ecole francaise d'Extreme-Orient 1969. Pp. 182.*

This volume deals with the ritual demarcation of Buddhist temples in Cambodia. The author describes the genesis and meaning of this ceremony peculiar to Cambodian Buddhism and very popular in that country. The limits of the Buddhist temple area within which the monks are bound by special rules, are fixed in a solemn manner by erecting boundary stones of a special shape ; and the area is consecrated with an elaborate ritual. We are given a detailed description of this ceremonial together with texts used in it.

The reviewer was struck by a certain coincidental similarity between this Buddhist consecration of the temple area and the

Christian consecration of a church, both containing a symbolical ceremonial with readings from the scriptures and prayers. An appendix gives a number of good photographs illustrating the text.

F. E.

Geschichte und Sozialordnung der Sherpa—Michael Oppitz Innsbruck-Munchen : *Universitatsverlag Wagner Ges M. B. H. 1968. Pp. 170.*

This volume on the history of the social organization of the Sherpas is a valuable contribution to our knowledge of a little known racial group that came to the notice of the world with the conquest of Mt. Everest in 1953 by Sherpa Tenzing Norgay and Sir Edmund Hilary.

The author of the book under review was a member of a team of German research workers engaged in an anthropological study of the Sherpa tribe of the Eastern Nepal region (in 1965). On the basis of many historical documents the team discovered, it was possible to reconstruct with reasonable certainty the Sherpa clan history, at least from the time of their migration, perhaps under pressure from the Mongol invasions, from Tibet into areas of Eastern Nepal. This colonization in different successive phases took place in the 15th and 16th centuries mainly. This resulted into the formation of several clans among which a certain hierarchy is observed. We are given a fairly developed outline of their social organization and structure. Their clan system accounts for their having remained a distinct ethnic group. The clans are patrilineal, exogamous ; about 8% of the Sherpa marriages are polygamous. Divorce is rather frequent among them. Among the legends and stories collected by the author in Sherpa-land, not quite a living being, nor yet a supernatural being either. The volume is very well documented with tables, photographs, maps and indexes.

F. E.